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GOVERNMENT REPORTS

Announcements & Index

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NATIONAL TECHNICAL INFORMATION SERVICE Melvin S. Day, Director

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GOVERNMENT REPORTS

Announcements & Index

Volume 80, Number 26 December 19, 1980

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*Committee on Scientific and Technical Information

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Category 3. Astronomy and Astrophysics

Subcategories: Astronomy; Astrophysics; Celestial Mechanics.

Category 4. Atmoshpheric Sciences

Subcategories: Atmospheric Physics; Meteorology.

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Subcategories: Conversion Techniques; Power Sources; Energy Storage.

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Category 16. Missile Technology

Subcategories: Missile Launching and Ground Support; Missile Trajectories; Missile Warheads and Fuses; Missiles

Category 17. Navigation, Communications, Detection, and Countermeasures

Subcategories: Acoustic Detection; Communications; Direction Finding; Electromagnetic and Acoustic Countermeasures; Infrared and Ultraviolet Detection; Magnetic Detection; Navigation and Guidance; Optical Detection; Radar Detection; Seismic Detection.

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Subcategories: Fusion Devices (Thermonuclear); Isotopes; Nuclear Explosions; Nuclear Instrumentation; Nuclear Power Plants; Radiation Shielding and Protection; Radioactive Wastes and Fission Products; Radioactivity; Reactor Engineering and Operation; Reactor Materials; Reactor Physics; Reactors (Power); Reactors (Non-power); SNAP Technology.

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SAMPLE ENTRY

Field 12—MATHEMATICAL SCIENCES
Group 12A—Mathematics and Statistics
PB80-104045 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm,
E. Kausel, and G. Bouckovalas. Aug 79, 49p
R79-12, NSF/RA-79-12, NSF/RA-790206
Grant NSF-ENV77-18339

An efficient numerical procedure is presented for the computation of Hankel Transforms. The algorithm is based on the expression of the Hankel Transform in terms of a two-dimensional Fourier Transform, which is then reduced to only one dimension. The latter is then evaluated with the Fast Fourier Transform algorithm. Examples are presented, and a listing of the computer program included.

NTIS Subject Category
NTIS Subcategory
NTIS order number Availability/Price codes
Corporate or Performing Organization

Report title

Personal authors Report date Page count
Report number(s)
Contract or grant number(s)

Abstract

1. AERONAUTICS

1A. Aerodynamics

AD-A087 868/6 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
TsAGI The Center of Aviation Science and Mechanics,
G. Svishchev. 23 Oct 79, 24p Rept no. FTD-ID(RS)T-1550-79
Edited trans. of Kryl'ya Rodiny (USSR) n12 p9-12, Dec 68, by Joseph E. Pearson.

No abstract available.

AD-A088 148/2 PC **A03**/MF **A01**
Dynamics Technology Inc Torrance CA
Feasibility Study of Applying Laminar Flow Control to an LTA Vehicle.
Final rept.,
Dwight J. Warner, Suphi A. Ozgur, and Wayne W. Haigh. Apr 80, 48p DT-7909-14, NADC-80144-60
Contract N00140-79-C-6565

The feasibility of applying laminar boundary-layer control with body shaping to a high altitude, Lighter-Than-Air vehicle was investigated. Solar-radiation-induced surface heating was shown to have a destabilizing effect on laminar flow and caused the laminar flow to break down on regions of the vehicle surface exposed to high levels of solar radiation. Aerodynamic drag estimates were made for the vehicle. Surface waviness and roughness criteria for achieving laminar flow were determined. (Author)

AD-A088 248/0 PC **A02**/MF **A01**
Lehigh Univ Bethlehem PA Dept of Mechanical Engineering and Mechanics
Theoretical & Experimental Investigation of Coherent Structure in the Turbulent Boundary Layer.
Rept. no. 1 (Annual) 1 May 79-30 May 80,
D. E. Abbott, C. R. Smith, and J. D. A. Walker. May 80, 17p AFOSR-TR-80-0567
Contract F49620-78-C-0071

This project combines both experimental video flow visualization studies and theoretical investiga-

tions of a series of phenomenological and theoretical models based upon the three-dimensional details of convected, coherent structural elements of a turbulent flow as it interacts with a solid surface. The progress over the past year has led to the experimental consideration of range of sub-problems including high Reynolds Number (4,000,000) turbulent flows, the effect of surface modification on low-speed streak formation, and the effect of vortex loop interaction with a solid boundary. To augment the visualization pictures, a computerized video-digitizing system has been developed. Preliminary results show tremendous promise for obtaining quantitative data from flow visualization pictures. The specific thrust of the theoretical studies has been focussed on three areas: (1) how two- and three-dimensional vortex structures interact with wall boundary layers, (2) the development of a new type of prediction method for two-dimensional turbulent boundary-layer flows, and (3) improvement in numerical techniques for solving parabolic, boundary-layer equations. (Author)

AD-A088 526/9 PC **A04**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
Boundary-Layer Flow on an Axisymmetric Body with an Inflected Stern.
Final rept.,
Thomas T. Huang, Nancy C. Groves, and Garnell Belt. Aug 80, 70p Rept no. DTNSRDC-80/064

Static pressure distributions, mean velocity profiles, distributions of turbulence intensities, and Reynolds stresses, spatial correlation coefficients, and the Taylor microscale of turbulence were measured across the stern boundary layer of an axisymmetric body with an inflected stern. A theoretical and numerical iteration scheme, which uses the boundary layer and open wake displacement body, is found to model satisfactorily the viscid-inviscid interaction between the thick stern boundary layer and the external potential flow. The measured values of turbulence intensity, eddy viscosity, and mixing-length parameters in the stern region are found to be much smaller than those of a thin boundary layer. An approximate similarity characteristic for the thick axisymmetric stern boundary layer is obtained when the measured mixing-length parameters, the measured correlation length scales, and the measured Taylor microscales are normalized by the square root of the boundary-layer cross-sectional area instead of the local boundary layer thickness. When this simple similarity hypothesis for the mixing length and the displacement body is incorporated into the McDonnell Douglas Corp., Cebeci-Smith differential boundary-layer method, modified to consider the displacement body and wake, the theory predicts very well the measured distributions of the mean velocity throughout the entire stern boundary layer.

N80-29243/6 PC**$15.00**
National Aeronautics and Space Administration, Washington, DC.
Aeronautical Engineering: A Continuing Bibliography, Supplement 124.
Jul 80, 130p NASA-SP-7037(124)

This bibliography, lists 450 reports, articles, and other documents introduced into the NASA scientific and technical information system in June 1980.

N80-29249/3 PC **A02**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Towards Complete Configurations Using an Embedded Grid Approach.
Final Report.
C. W. Boppe. Jul 78, 19p NASA-CR-3030
Contract NAS1-14732

A new approach to simulating transonic flow about transport configurations is briefly outlined. The methods embedded grid scheme provides a high degree of computational resolution coupled with geometric flexibility for future applications to complex shapes. Calculations presented illustrate aspects of transonic transport design including fuselage design, determination of wing control surface deflection effectiveness, and wing design.

N80-29254/3 PC **A07**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A Computer Program for the Design and Analysis of Low-Speed Airfoils.
R. Eppler, and D. M. Somers. Aug 80, 145p NASA-TM-80210, L-12937

A conformal mapping method for the design of airfoils with prescribed velocity distribution characteristics, a panel method for the analysis of the potential flow about given airfoils, and a boundary layer method have been combined. With this combined method, airfoils with prescribed boundary layer characteristics can be designed and airfoils with prescribed shapes can be analyzed. All three methods are described briefly. The program and its input options are described. A complete listing is given as an appendix.

N80-29287/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Wind-Tunnel Experiments on Divergence of Forward-Swept Wings.
R. H. Ricketts, and R. V. Doggett, Jr.. Aug 80, 49p NASA-TP-1685, L-13549

An experimental study to investigate the aeroelastic behavior of forward-swept wings was conducted in the Langley Transonic Dynamics Tunnel. Seven flat-plate models with varying aspect ratios and wing sweep angles were tested at low speeds in air. Three models having the same planform but different airfoil sections (i.e., flat-plate, conventional, and supercritical) were tested at transonic speeds in Freon 12. Linear analyses were performed to provide predictions to compare with the measured aeroelastic instabilities which include both static divergence and flutter. Six subcritical response testing techniques were formulated and evaluated at transonic speeds for accuracy in predicting static divergence. Two 'divergence stoppers' were developed and evaluated for use in protecting the model from structural damage during tests.

PATENT-4 212 199 Not available NTIS
National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, CA.
System for Use in Conducting Wake Investigation for a Wing in Flight.
Patent,
P. F. Bikle, and L. C. Montoya. Filed 28 Feb 79, patented 15 Jul 80, 9p N80-28300/5, PAT-APPL-6-015 983
Supersedes PAT-APPL-6-015 983, N79-17797 (17 - 09, p 1069).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A system supported by a wing in flight is described which has a reference total pressure port in spaced relation with a wake as the wake is generated by the wing, a reference static pressure port supported in spaced relation with the wake, and a probe adapted to be displaced along an accurate path through the wake including a total pressure port and static pressure ports. A differential pressure transducer and a pressure switching device are interposed between the ports and the transducer is provided for selectively connecting pairs of the ports to the transducer in opposed relation, whereby a single transducer is utilized to obtain differential pressure measurement for the wake with enhanced accuracy.

1B. Aeronautics

AD-A087 976/7 PC **A11**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Atmospheric Electricity-Aircraft Interaction.
Lecture series.
May 80, 230p Rept no. AGARD-LS-110

The potential susceptibility of aircraft to atmospheric electricity hazards (such as lightning and static charging phenomena) appears as an increasing threat to future aircraft for two reasons: on the one hand, more and more sensitive solid-state electronics and microprocessors will be used in the future on flight critical equipment, as can be anticipated from advanced guidance and control hardware developments: on the other hand, new structural materials, such as dielectrics and composites, will be extensively used for aircraft, leading to potential problems due to surface charges and reducing the electromagnetic shielding protection offered by the conventional metallic skins on present-day vehicles. Starting with fundamentals of atmospheric electricity phenomena, the Lecture Series reviews the hazards, criteria, testing and avionics protection, and provides insights from both pilot and design perspectives. In view of the above, this Lecture Series should be of interest to aircraft manufacturers, airline operators, government and industrial research establishments, and avionics engineers.

AD-A088 012/0 PC **A05**/MF **A01**
Clemson Univ SC Dept of Zoology
Direct Visual and Radar Methods for the Detection, Quantification, and Prediction of Bird Migration.
Final rept. 1 Jan 79-8 Feb 80,
Sidney A. Gauthreaux, Jr. 30 Apr 80, 77p
AFOSR-TR-80-0594
Grant AFOSR-79-0038

The use of radar to detect, quantify, and monitor the movements of birds aloft is treated in detail. Direct visual means of studying migration are also included because these techniques aid in identifying the birds responsible for the echoes displayed on the radar screens, and they are indispensible to quantifying the radar displays of migrating birds. A new image intensifier-ceilometer technique for viewing migrating birds at night is described. The technique can be automated and permits remote monitoring by means of closed circuit television. Forecasting dense migrations of birds in spring and fall has great utility to the aviation community, and this topic is covered in some detail. The combined methods of direct visual observation and radar surveillance in conjunction with knowledge of the weather conditions that are conducive to dense movements of birds offer great promise for reducing the hazards that migrating birds pose to aircraft. The methods are also essential for basic investigations of the seasonal movements of millions of birds through the atmosphere.

AD-A088 029/4 PC **A09**/MF **A01**
Calspan Advanced Technology Center Buffalo NY
Advanced Restraint System Modeling.
Final technical rept. Apr 78-Nov 79,
Frank E. Butler, and John T. Fleck. May 80, 176p
CALSPAN-6306-V-1, AFAMRL-TR-80-14
Contract F33615-78-C-0516
Prepared in cooperation with J and J Technologies, Inc., Orchard Park, NY.

The Articulated Total Body (ATB) model is currently being used by the AFAMRL to study the biomechanics of the pilot-seat ejection from an aircraft. The new ATB-II model presented in this report incorporates features developed since the original ATB model completion and new mathematical algorithms designed to improve the usefulness and correct some of the deficiencies of the model. The new features developed for this research program are a new harness-belt system, rate dependent force producing functions, arbitrary specification of the motion of multiple segments and the computation of the initial orientation from orthogonal projections of the segment axes. (Author)

AD-A088 034/4 PC **A08**/MF **A01**
Bunker-Ramo Corp Westlake Village CA Electronic Systems Div
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 0. Analysis and Mockup. Volume I. Results.
Final rept. 4 Jun 78-31 May 79,
Gregory J. Barbato, Ralph P. Madero, George A. Sexton, Richard W. Moss, and William R. Brandt. May 80, 163p AFWAL-TR-80-3030-VOL-1
Contract F33615-78-C-3614
See also Volume 2, AD-A088 035.

This report documents a mockup cockpit design study which was performed in support of the USAF KC-135 Avionics Modernization Program. The preliminary issues addressed during the study were the avionics control and display criteria to be met

in the event of a reduction in crew size for the KC-135. The study results indicated that two pilots and a boom operator could successfully fly the depicted mission scenario by reallocating various crew tasks and by utilizing 1980 state-of-the-art avionics/navigation systems. (Author)

AD-A088 035/1 PC **A12/MF A01**
Bunker-Ramo Corp Westlake Village CA Electronic Systems Div
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 0. Analysis and Mockup. Volume II. Summary of Data.
Final rept. 4 Jun 78-31 May 79,
Gregory J. Barbato, Ralph P. Madero, George A. Sexton, Richard W. Moss, and William R. Brandt. May 80, 265p AFWAL-TR-80-3030-VOL-2
Contract F33615-78-C-3614
See also Volume 3, AD-A088 036.

This volume contains three sections which comprise the results of the questionnaires used during mockup evaluation. It includes the rating scale packages used by the pilots, copilots, and boom operators to complete the questionnaires, the responses to these questionnaires summarized for each design update and each question, and the comments made by the subjects during debriefing sessions and in response to questionnaire inquiries.

AD-A088 036/9 PC **A08/MF A01**
Bunker-Ramo Corp Westlake Village CA Electronic Systems Div
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 0. Analysis and Mockup. Volume III. Mission Scenario.
Final rept. 4 Jun 78-31 May 79,
Gregory J. Barbato, Ralph P. Madero, George A. Sexton, Richard W. Moss, and William R. Brandt. May 80, 163p AFWAL-TR-80-3030-VOL-3
Contract F33615-78-C-3614
See also Volume 1, AD-A088 934,

This volume contains (1) a 'ribbon-in-the-sky' depiction of the mission scenario used during the mockup exercise, (2) a narrative overview of each mission leg, (3) a mission profile graph depicting climbs and descents during the different mission segments, and (4) the mission scenario for each leg which outlines the specific tasks to be accomplished by the pilot, copilot, and boom operator during the mockup 'flying' session.

AD-A088 150/8 PC **A05/MF A01**
Federal Aviation Administration Washington DC Systems Research and Development Service
Helicopter Terminal Instrument Procedures (TERPS) Development Program.
Final rept.
Jun 80, 78p Rept no. FAA-RD-80-59

The Helicopter TERPS Development Program is designed to collate and coordinate all inputs received from government-sponsored and other projects which relate to helicopter TERPS in order to: assure that data generated by each project is developed, coordinated and applied in such a way as to avoid duplication of effort while achieving results in minimum time. It describes a development program whose objective is to develop criteria which will maximize the efficiency of terminal area and enroute operations with helicopters, by applying the unique maneuver-performance of helicopters. It includes both a near-term and long-term review of TERPS, both of which are expected to generate modification of the U.S. Standard for Terminal and Enroute Instrument Procedures and the criteria and procedures contained therein. The FAA, other Federal Government agencies, and organizations participating in this effort are identified. Program management responsibilities are addressed and a program schedule with milestones is presented. (Author)

AD-A088 151/6 PC **A05/MF A01**
Helicopter Association of America Inc Washington DC
Helicopter Northeast Corridor Operational Test Support.
Final rept. Apr 79-Jun 80,
Glen A. Gilbert. Jun 80, 83p FAA-RD-80-80
Contract DOT-FA79WA-4303
See also Rept. no. FAA-RD-80-17, AD-A088 024.

With the growing importance of helicopters to the national air transportation system, a demand is developing for more IFR (virtually all-weather) helicopter capability. At the same time, it is essential that helicopters be able to take advantage of their unique features and operate within the common ATC system without conflict to or from conventional fixed wing air traffic. A 'test bed' operation was established progressively by the FAA in cooperation with the HAA during the period 1975-1978 to develop real world applications of these and other helicopter operational concepts in the Northeast Corridor (NEC) of the United States. During mid-1979 to early 1980 a nine month controlled NEC test and evaluation project was carried out jointly by the HAA and the FAA. This HAA report describes the methodology and procedures followed, results obtained during the controlled test period, and conclusions and recommendations reached. The complementary FAA Technical Center report referred to in item 15 above will be issued separately. (Author)

AD-A088 155/7 PC **A06/MF A01**
Federal Aviation Administration Washington DC Office of Systems Engineering Management
The Effect of Whisper/Shout on Active BCAS Performance,
Edmund J. Koenke, and Sandra Boczenowski. Jun 80, 116p Rept no. FAA-EM-80-5

When BCAS is operating in a high density environment the presence of synchronous garble will interfere with target detection. This report presents a simulation tool used to analyze the BCAS operation in a garble environment with several design variations. The chief BCAS enhancement evaluated was the technique known as whisper/shout. This technique can effectively reduce the garble problem when a BCAS aircraft operates in terminal airspace. In addition, the effectiveness of degarble capabilities is demonstrated in various airspace densities. A low cost general aviation CAS is evaluated with the same model and performs well in terminal airspace. It is concluded that in order to satisfy the draft U.S. National Aviation Standard for BCAS that a system must use full degarbling, whisper/shout and at least a 1-second update rate. (Author)

AD-A088 232/4 PC **A06/MF A01**
National Aviation Facilities Experimental Center Atlantic City NJ
Dynamic Air Traffic Control Simulation of Profile Descent and High-Speed Approach Fuel Conservation Procedures.
Final rept. Jul 77-Aug 77,
P. James O'Brien, Francis M. Willett, Jr., and Leonard Tobias. May 80, 125p FAA-NA-79-28, FAA-RD-80-12

A dynamic simulation of instrument flight rule (IFR) air traffic operations in the Denver, Colorado, terminal area was conducted at the National Aviation Facilities Experimental Center (NAFEC) to investigate aircraft fuel conservation procedures and the compatibilities of these procedures with air traffic control (ATC) and with the expeditious flow of air traffic. The laboratory environment of the NAFEC Air Traffic Control Simulation Facility (ATCSF) was utilized along with two Ames Research Center (ARC) piloted flight simulators. The ARC simulators were interfaced with the ATCSF via a landline system and were flown within the simulated environment together with the NAFEC computer-generated flights. Fuel conservative procedures tested were the profile descent and two high-speed approaches, the delayed flap approach and the International Air Transport Association (IATA) approach. The Denver terminal radar approach control (TRACON) was simulated, and traffic was representative of Stapleton Airport IFR operations. Results showed that, by comparison with conventional procedures, fuel was saved when only the the profile descent procedure was used. Fuel saving with the high-speed approach procedures, as simulated, was questionable. There was an indication of a fuel saving when departure flights were not restricted to maintaining 250 knots at 10,000 feet and below. Additionally, a graphic study showed that, at landing gross weight conditions, the most desirable holding altitudes were between 20,000 and 30,000 feet. A more in-depth study of the ramifications of computer-aided flight scheduling and latest technology in fuel saving flight procedures is recommended. (Author)

AD-A088 370/2 PC **A04/MF A01**
Federal Aviation Administration Washington DC Office of Management Systems
Terminal Area Air Traffic Relationships (Peak Day/Busy Hour).
1979, 69p

Terminal Area Air Traffic Relationships furnishes peak day and busy hour air traffic counts for each airport at which Federal Aviation Administration air traffic control tower operated during all of fiscal year 1979. Also provided are average daily and hourly operations computed from the annual operations count. Measures of peaking characteristics are given by the ratios peak day to average day and of busy hour to average hour by individual airports. The airports are separated into air carrier and general aviation airports because of the different characteristics of the two groups. (Author)

AD-A088 415/5 PC **A03/MF A01**
Federal Aviation Administration Technical Center Atlantic City NJ
The Effect of the Western Union Weather Data System on the Preflight Briefing Position at the Chicago Flight Service Station.
Final rept. Aug 75-May 78,
Ephraim Shochet, James D. Talotta, and Robert P. Holladay. Jul 80, 29p FAA-CT-79-55, FAA-RD-80-23

An experiment utilizing a 'before/after' research design was conducted to determine the effect of the Western Union Weather Data System (WDS) on the preflight briefing position at the Chicago, Illinois, Flight Service Station (FSS). Specialist activity was recorded by making written annotations on a moving paper chart called a kymograph. The average length of time spent in each activity prior to the installation of automated equipment was compared to the time spent in the same activity after automation. In addition, a questionnaire survey and personal interviews with specialists were conducted in the 'after' period. The data obtained from the specialist opinion survey indicate that the WDS improved the quality of flight information service to the user pilot and improved job satisfaction for the specialist. The objective data was congruent with and in the same direction as the data that was obtained from the specialist opinion survey. However, the specialists perceived a greater reduction in workload than was measured in the before and after comparsion of preflight briefing times. (Author)

PB80-815020 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Collision Avoidance Systems. 1964-July, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jul 80,
Guy E. Habercom, Jr. Aug 80, 425p
Supersedes NTIS/PS-79/0960, and NTIS/PS-78/0883.

Collision avoidance systems in three modes of transportation (i.e. air, surface, marine) are investigated in these research reports. Section 1 pertains to air transportation. Traffic scheduling, automatic ground based stations, and on-board warning systems are researched. (Contains 300 abstracts) Section 2 delineates sensors and detectors relative to marine transportation collision avoidance. (Contains 68 abstracts) Section 3 relates to engineering research relative to highway and rail collision avoidance. (Contains 46 abstracts) (This updated bibliography contains 416 citations, 33 of which are new entries to the previous edition.)

1C. Aircraft

AD-A087 867/8 PC **A24/MF A01**
Foreign Technology Div Wright-Patterson AFB OH
Icing of Aircraft and Means of Combatting It,
O. K. Trunov. 5 Sep 79, 552p Rept no. FTD-ID(RS)T-1162-79
Unedited machine trans. of mono. Obledeneniye Samoletov i Sredstva Bor'by s Nim, Moscow, 1965 p1-247.

No abstract available.

AD-A087 875/1 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Aviation and Kosmonautics (Selected Articles).
4 Jan 80, 26p Rept no. FTD-ID(RS)T-1812-79
Unedited machine trans. of Aviatsiya i Kosmonautika (USSR) n12 p28-32 Dec 68.

No abstract available.

AD-A087 953/6 PC **A07**/MF **A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 119. C-135B Aircraft, Near and Far-Field Noise.
Technical rept.,
Robert G. Powell. Dec 79, 149p Rept no. AFAMRL-TR-75-50-VOL-119
See also Volume 120, AD-A079 866 and Volume 1, AD-A031 865.

The USAF C-135B is a long-range, high performance, transport aircraft powered by four TF33-P-5 turbofan engines. This report provides measured and extrapolated data defining the bioacoustic environments produced by this aircraft operating on a concrete runup pad for six engine/power configurations. Near-field data are reported for eleven locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Far-field data measured at 19 locations are normalized to standard meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for these same seven acoustic measures as functions of angle and distance from the source. Refer to Volume 1 of this handbook, 'USAF Bioenvironmental Noise Data Handbook, Vol 1: Organization, Content and Application', AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. (Author)

AD-A088 057/5 MF **A01**
Boeing Vertol Co Philadelphia PA
Design and Analysis of CH-47 External Cargo Handling System (Snubbed Load).
Final rept. Sep 77-Oct 79,
Theodore S. Garnett, Jr., Richard F. Campbell, and David J. Hodder. Oct 79, 458p Rept no. D210-11555-1
Contract DAAJ02-77-C-0069
Availability: Microfiche copies only.

Development of a preliminary design concept to snub containerized external cargo loads to the CH-47 aircraft, for improved terrain and Night/IMC flight capability, has been completed. Results are suitable for detail design implementations leading to prototype demonstration of the system in the future. The External Cargo Handling System (ECHS) snubs loads (of up to 25,000 lbs. weight) against the helicopter landing gear, using a self hoisting adapter framework powered by 6 horsepower tandem electric hoists installed of nonlinear vibration isolation mounts to interface the load with the aircraft. The ECHS snubbing adapter uses guide arms for load acquisition assistance, and twistlocks to lock the load to the adapter. No structural modification to the CH-47 is required. Compared to carrying cargo on conventional external sling suspension with a CLAH adapter, load snubbing provides a substantial performance benefit for terrain flight missions; and at the same time improves both masking and maneuverability along with capability for flight at night, or in IMC condition. (Author)

AD-A088 126/8 MF **A01**
General Accounting Office Washington DC Procurement and Systems Acquisition Div
Need to Demonstrate F-18 Naval Strike Fighter Weapon System Effectiveness before Large-Scale Production.
27 Feb 79, 26p Rept no. GAO/PSAD-79-25
Report to the Congress. Unclassified version of AD-C019 699.
Availability: Microfiche copies only.

The high cost and waste of concurrent development and production have been demonstrated many times in the past. The risks associated with concurrency appear to increase when time does not permit complete and adequate testing. Major programs appear to develop a momentum of their own, where definable costs of delaying a program to complete testing override potential, but usually real and very large costs which result from inadequate or incomplete testing before going into production. In view of the time limitations on testing the F-18 weapon system before major decisions, the potential for delays in performing planned tests, and the lack of time for testing corrections to problems identified during testing, we believe the extent of concurrency may be even greater than what appears now. F-18 aircraft performance degradation has been estimated to have occurred, and this adversely affects the ability of the system to perform its mission. Also, problems with the ordnance systems to be used on the F-18 will have a further degrading effect on its ability to perform its mission.

AD-A088 164/9 PC **A05**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Investigation of Transient Induced Aerodynamics in a Moving Deck Environment.
Final rept. Oct 78-Sep 79,
Robert E. Palmer. 7 Feb 80, 80p Rept no. NADC-79260-60

Operating a V/STOL aircraft in ground effect can greatly alter the aerodynamic forces and moments acting on the aircraft. By introducing a moving ground plane, such as the deck of a DD963 class destroyer, the complexity of the resulting flow field is significantly increased. This added complexity makes it even more difficult to perform successful shipboard takeoff and recovery operations. In order to fully utilize the potential shipboard operational capabilities of V/STOL aircraft a better understanding of these phenomena is required. To accomplish this, the effects of basic single axis deck motions must be examined. Analysis of these independent deck motions (heave, pitch, roll) enable the development of prediction techniques applicable to a preliminary design environment. These methods provide the designer a tool for estimating the transient induced aerodynamics acting on a V/STOL aircraft in a moving deck environment. Data for the three-fan subsonic V/STOL configuration was selected for study.

AD-A088 168/0 PC **A09**/MF **A01**
Monsanto Research Corp Dayton OH Dayton Lab
Integral Aircraft Fuel Tank Leak Classification.
Interim technical rept. 1 Sep 78-15 Apr 79,
Leo Parts, Thomas J. Bucher, Benito P. Botteri, and Robert E. Cretcher. Jan 80, 193p MRC-DA-894, AFAPL-TR-79-2992
Contract F33615-78-C-2023

A parametric study has been conducted to investigate external leakage from aircraft integral fuel tanks. The effects of the following parameters on the rate of surface dispersion of fuels were examined: fuel type, leakage rate, surface material, fuel and surface temperature, air flow rate over the test surface, and surface angle of inclination. The dispersing fuel films were found to be very thin (0.05 mm/0.002 in.); i.e., limited liquid volume flow results in extensive surface coverage. Fuels of low volatility such as JP-5 and JP-8 dispersed at a faster rate over the surface and exhibited a greater propensity for dripping than those of high volatility (AvGas and JP-4). Low temperatures, inclined surfaces, and polyurethane latex surface coating enhanced fuel dripping from the test surface. Fuel flow rates required to support sustained burning at the leakage site were investigated with JP-4, JP-5, JP-8, JP-4/JP-8 mixtures, and AvGas. The measurements were conducted at temperatures ranging from 3.3 C to 98 C (38 F to 209 F). The vapor pressure of the fuel at the test temperature has a very pronounced effect on the propensity of the leaking fuel to sustain burning. The minimum volume flow rates required for sustained burning ranged from 0.2 ml/min. (AvGas at 23 C (73 F)) to 9 ml/min. (JP-5 at 98 C (208 F)).

AD-A088 169/8 PC **A02**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
The Normal Modes of Beam-Like Structures by a Lanczos-Stodola Method.
Technical rept.,
T. Niblett. May 80, 15p RAE-TR-80058, DRIC-BR-74671

A method of finding the flexural and torsional normal modes of structures which have straight stiffness axes and which are mounted as cantilevers is given. The Lanczos method of minimised iterations is used to obtain intermediate modes using the integro-differential equations and the mass and stiffness distributions. The inertia matrix appropriate to the intermediate modes is tridiagonal and the stiffness matrix is unit. The dominant eigenvalues and vectors of the inertia matrix give good approximations to the graver normal bodies. Results of test calculations using a computer program which also allows for the presence of discrete masses are given.

AD-A088 197/9 PC **A04**/MF **A01**
Shaker Research Corp Ballston Lake NY
Helicopter Transmission Improvement Study.
Interim rept.,
J. M. McGrew. Sep 76, 65p
Contract N62269-75-C-0499

A study has been completed which shows that the use of finer filtration than present practice results in a significant improvement in transmission service life. Four candidate filter approaches are identified which potentially offer finer filtration than presently used filters. Recommendations are made for implementation of these concepts in existing Naval helicopters. (Author)

AD-A088 233/2 PC **A03**/MF **A01**
George Washington Univ Washington DC School of Engineering and Applied Science
Development of Fracture Mechanics Concepts Applicable to Aircraft Structures.
Final scientific rept. 1 May 78-30 Apr 79,
P. K. Poulose, and D. L. Jones. May 79, 27p
Contract N00019-78-C-0301

The dependence of cyclic nonlinear energy toughness on the fatigue lives of precracked specimens was studied using two aluminum alloys, 2024-T3 and 7075-T6. An exponentially increasing load program was used for determining the fatigue lives. The cyclic toughness values for both alloys decreased as a logarithmic function of the fatigue lives. For a given life the toughness value for 2024-T3 was higher than that for 7075-T6, but the difference decrease with increasing cyclic life. An accelerated test program for prediction of constant amplitude fatigue lives of precracked specimens was undertaken. An analytical basis for this method was developed using an exponentially increasing load sequence. Accelerated tests were carried out on 2024-T3 and 7075-T6 using linearly and exponentially increasing loads and appropriate curves of the form of higher-order hyperbolas were fitted to the data using the method of least squares. The constant amplitude curve predicted from these results will be compared with the constant amplitude test results in the second stage of this program. (Author)

AD-A088 318/1 PC **A06**/MF **A01**
United Technologies Corp Stratford CT Sikorsky Aircraft Div
Helicopter Dynamic Performance Program. Volume II. User's Manual.
Final rept.,
R. E. Studwell. Jul 80, 101p SER-510011-VOL-2, USARTL-TR-79-27B
Contract DAAJ02-76-C-0066
See also Volume 1, AD-A088 474.

The program provides a means of rapidly estimating rotorcraft takeoff and landing capabilities from or to any given heliport size or location. Proper application of the instructions outlined herein for computing opertional capabilities and flight procedures can minimize the risk and cost of testing rotorcraft capabilities in the takeoff, landing and emergency of flight. The program has been written in FORTRAN IV and designed primarily for interactive operation on the IBM 360/65 computer system, in conjunction with a PDP-11 and DEC-GT-40 scope and a Houston bed type plotter. Interfacing with a Tektronix storage tube Model 4010, 4012, or 4014, the Houston plot bed and the

IBM 360/65 is also available. Options for batch processing with and without Houston plots has been provided. With minor modifications the program can also be interfaced with a CDC or UNIVAC 1110 in lieu of the IBM 360/65. Program modifications required for CDC 6600 compatibility are covered in Section 9 of this report. (Author)

AD-A088 325/6 PC **A08**/MF **A01**
Systems Research Labs Inc Newport News VA RASA Div
Investigation of Performance, Noise, and Detectability Characteristics of Remotely Piloted Vehicle (RPV) Propellers.
Final rept.,
D. S. JanakiRam. Jun 80, 168p RASA/SRL-14-79-05, USAAVRADCOM-TR-80-D-7
Contract DAAJ02-77-C-0029

Several small-scale propeller configurations applicable to a conceptual Remotely Piloted Vehicle (RPV) aircraft were designed, fabricated, and tested to determine their performance, acoustic, and detectability characteristics. The tests were conducted in static and simulated forward flight conditions in a wind tunnel. Propellers tested included tractor, pusher, and ducted configurations. The acoustic data obtained was used to determine the slant range and altitude of no detection of each propeller configuration. The data was analyzed to determine the effects of blade number, blade design (activity factor and twist), diameter, tip speed, thrust, and forward velocity on the acoustic and detectability characteristics of the propeller configurations tested. The performance data did not show any conclusive trends except that the ducted and pusher propeller configurations tested were less efficient than their open and tractor counterparts respectively.

AD-A088 351/2 PC **A10**/MF **A01**
Sandaire San Diego CA
Conceptual Point Design Study of a New CTOL SETOLS CAS Aircraft for 1995 IOC.
Final technical rept. 7 Mar-20 Jun 79,
P. D. Sorensen, R. L. Bayless, and E. F. Noel. 20 Jun 79, 219p NADC-78155-20
Contract N62269-79-C-0438

A conceptual design of a CTOL SETOLS CAS aircraft has been developed. The significant design feature is the use of a Surface Effect Takeoff and Landing System (SETOLS) in lieu of a normal landing gear. The SETOLS is an integral part of the point design, thereby achieving full design compatibility. This feature provides takeoff and landing capability, on the inflated rubber fabric type trunk installed on the bottom of the fuselage, from any unobstructed area such as water, grass, soil, etc. Effective operation is thereby achieved with a Conventional Takeoff and Landing (CTOL) aircraft design in the Close Air Support (CAS) mission from forward bases where time prevents construction and repair of long, hard surface runways. Advanced state-of-the-art design, appropriate for 1995 IOC, has been incorporated. One advanced technology Pratt & Whitney STF 529 turbofan is used for propulsion and trunk pressurization. (Author)

AD-A088 441/1 PC **A13**/MF **A01**
Simula Inc Tempe AZ
Aircraft Crash Survival Design Guide. Volume IV. Aircraft Seats, Restraints. Litters, and Padding.
Final rept. Sep 77-Feb 80,
S. P. Desjardins, and D. H. Laananen. Jun 80, 276p TR-7822, USARTL-TR-79-22D
Contract DAAJ02-77-C-0021
Supersedes AD-733 358 dated Oct 71 and all previous editions. See also Volume 5, AD-A082 513.

This five-volume document has been assembled to assist design engineers with the development of crashworthy U.S. Army aircraft. The five volumes of the Aircraft Crash Survival Design Guide cover the following topics: Volume I - Design Criteria and Checklists; Volume II - Aircraft Crash Environment and Human Tolerance: Volume III - Aircraft Structural Crashworthiness; Volume IV - Aircraft Seats, Restraints, Litters, and Padding; Volume V - Aircraft Postcrash Survival. This volume (Volume IV) contains information on aircraft seats, litters, personnel restraint systems, and hazards in the occupant's immediate environment. Requirements for design of seats, litters, and restraint systems are discussed, as well as design principles for meeting these requirements and testing for verification that the systems perform as desired. Energy-absorbing devices for use in seat are described, as are various types of cushions. Delethalization of cockpit and cabin interiors is discussed, including the use of protective padding and the design of controls for prevention of injury. Finally, computerized methods of analysis for evaluation of seats, restraints, and the occupant's immediate environment are presented.

AD-A088 474/2 PC **A07**/MF **A01**
United Technologies Corp Stratford CT Sikorsky Aircraft Div
Helicopter Dynamic Performance Program. Volume I. Engineer's Manual.
Final rept. Nov 76-Nov 78,
Robert E. Studwell. Jul 80, 136p SER-510011-VOL-1, USARTL-TR-79-27A
Contract DAAJ02-76-C-0066
See also Volume 2, AD-A088 318.

A computer program for evaluating helicopter performance in accelerated flight has been developed. The program was designed to permit analysis of any definable single rotor helicopter. Provisions for partial or total power loss at any point along the flight path are included. To accommodate emergency conditions provisions are made for evaluation of auxiliary power devices, tip rockets, JATO, RATO, fly wheels, drag brakes, and dropping of external loads. Optimization routines for establishing height-velocity envelopes are also included. The program is linked with a plot package which provides 40 prime output variables to be plotted. A perspective view of the flight path and plots of height-velocity diagrams are also available. This volume covers the engineering aspects of the program. Volume II presents the User's Manual. (Author)

AD-A088 500/4 Not available NTIS
Army Research and Technology Labs Moffett Field CA
Torsion of Pretwisted Beams due to Axial Loading,
Dewey H. Hodges. Apr 79, 5p
Availability: Pub. in Jnl. of Applied Mechanics, v47 n2 p393-397 Jun 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 530/1 PC **A09**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Aircraft Assessment and Acceptance Testing.
Lecture series.
May 80, 197p Rept no. AGARD-LS-108

The Lecture Series reviews the present state of the art of aircraft assessment and acceptance testing of production aircraft. This particular kind of testing is needed to select, from a variety of offers, the best aircraft type for a mission and to check that any aircraft on the production line is identical to the type, with acceptable tolerances. Emphasis is placed on the practical aspects of this technique in order to help the flight crews and organizations dealing with this activity. Flight test instrumentation methods are set forth that do not require the use of sophisticated ground and airborne instrumentation for data acquisition or large computers for data processing. Flight test techniques described illustrate ways to acquire acceptable results utilizing a minimum of instrumentation or no instrumentation. (Author)

N80-29244/4 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Control-System Techniques for Improved Departure/Spin Resistance for Fighter Aircraft.
L. T. Nguyen, W. P. Gilbert, and M. E. Ogburn. Aug 80, 69p NASA-TP-1689, L-13453

Some fundamental information on control system effects on controllability of highly maneuverable aircraft at high angles of attack are summarized as well as techniques for enhancing fighter aircraft departure/spin resistance using control system design. The discussion includes: (1) a brief review of pertinent high angle of attack phenomena including aerodynamics, inertia coupling, and kinematic coupling; (2) effects of conventional stability augmentation systems at high angles of attack; (3) high angle of attack control system concepts designed to enhance departure/spin resistance; and (4) the outlook for applications of these concepts to future fighters, particularly those designs which incorporate relaxed static stability.

N80-29245/1 PC **A19**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Subsonic Aircraft: Evolution and the Matching of Size to Performance.
L. K. Loftin, Jr.. Aug 80, 445p NASA-RP-1060, L-13367

Methods for estimating the approximate size, weight, and power of aircraft intended to meet specified performance requirements are presented for both jet-powered and propeller-driven aircraft. The methods are simple and require only the use of a pocket computer for rapid application to specific sizing problems. Application of the methods is illustrated by means of sizing studies of a series of jet-powered and propeller-driven aircraft with varying design constraints. Some aspects of the technical evolution of the airplane from 1918 to the present are also briefly discussed.

N80-29262/6 PC **A05**/MF **A01**
Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (Germany, F.R.).
Transonic Airfoils: The Design of a Supercritical Wing for Transport Aircraft.
Final Report, Oct. 1978.
G. Krenz. Oct 79, 85p BMFT-FB-W-79-11, PR-2
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

As part of the Airbus A 300 B10 (A310) development program, the design and wind tunnel characterization of four supercritical wings in a transonic flow are reported on. Wind tunnel measurements made on airfoil profiles are analyzed. Results are used in the choice of a wing configuration for a full scale model to be subjected to further transonic wind tunnel tests. Model construction and data collection schemes are discussed. Transonic flow theory is also considered. At present, the influence of the engine assembly on the wing configuration and its flow field has yet to be satisfactorily calculated.

N80-29263/4 PC **A03**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
The Strength of Occupant Restraint System in Light Aircraft: An Experimental Evaluation.
S. R. Sarrailhe. Feb 79, 40p ARL-STRUC-REPT-375, AR-001-600

The cabins and restraint systems of three cyclone-damaged light aircraft were tested statically to determine the strength of the restraint system in the cabin. It was found that most restraining components were much stronger than demanded by the 9 g requirement and it was considered that only minor improvements would be needed to ensure 25 g capability. Seats were not as strong as the restraints and their behavior under crash load conditions requires further investigation.

N80-29297/2 PC **A06**/MF **A01**
General Electric Co., Cincinnati, OH. Advanced Engineering and Technology Programs Dept.
Quiet Clean Short-Haul Experimental Engine (Qcsee) under-the-Wing (Utw) Composite Nacelle Test Report. Volume 2: Acoustic Performance.
D. L. Stimpert. Nov 79, 124p NASA-CR-159472, R78AEG-574-V-2
Contract NAS3-18021
2.

High bypass geared turbofan engines with nacelles forming the propulsion system for short-haul passenger aircraft were tested for use in externally blown flap-type aircraft. System noise levels for a four-engine, UTW-powered aircraft operating in the powered lift mode were calculated to be 97.2 and 95.7 EPNdB at takeoff and approach, respec-

tively, on a 152.4 m (500 ft) sideline compared to a goal of 95.0 EPNdB.

N80-29298/0 PC **A04**/MF **A01**
General Electric Co., Cincinnati, OH. Advanced Engineering and Technology Programs Dept.
Quiet Clean Short-Haul Experimentatal Engine (Qcsee) under-the-Wing Engine Composite Fan Blade: Preliminary Design Test Report.
May 75, 63p NASA-CR-134846, R75AEG411
Contract NAS3-18021

Results of tests conducted on preliminary design polymeric-composite fan blade for the under the wing (UTW) OCSEE engine are presented. During this phase of the program a total of 17preliminary OCSEE UTW composite fan blades were manufactured for various component tests including frequency characteristics, strain distribution, bench fatigue, dovetail pull, whirligig overspeed and whirligig impact. All tests were successuflly completed with the exception of whirligig impact tests. Improvements in local impact capability are being evaluated for the OCSEE blade under other NASA and related programs.

N80-29367/3 PC **A04**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Rockets for Spin Recovery.
R. D. Whipple. Aug 80, 70p NASA-CR-159240
Contract NAS1-15348

The potential effectiveness of rockets as an auxiliary means for an aircraft to effect recovery from spins was investigated. The advances in rocket technology produced by the space effort suggested that currently available systems might obviate many of the problems encountered in earlier rocket systems. A modern fighter configuration known to exhibit a flat spin mode was selected. An analytical study was made of the thrust requirements for a rocket spin recovery system for the subject configuration. These results were then applied to a preliminary systems study of rocket components appropriate to the problem. Subsequent spin tunnel tests were run to evaluate the analytical results.

N80-29368/1 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Simulator Results of an F-14A Airplane Utilizing an Aileron-Rudder Interconnect During Carrier Approaches and Landings.
Progress Report, Jan. 1979 - Feb. 1980.
W. W. Kelly, and P. W. Brown. May 80, 92p NASA-TM-81833

A piloted simulator study was conducted to evaluate an aileron rudder interconnect (ARI) control system for the F-14A airplane in the landing configuration. Effects on pilot performance and handling characteristics were investigated. Two ARI configurations were tested and compared to the standard F-14 fleet control system. A nonlinear aerodynamic model of the F-14 was used in conjunction with a six degree of freedom motion base simulator. The evaluation task, which utilized three subject pilots, consistent of a night carrier approach and landing. Both ARI configurations produced improved pilot performance and pilot ratings when compared to the standard control system. Sideslip due to adverse yaw as considerably reduced by the ARI systems and heading control was more stable and precise. Lateral deviation from centerline was reduced during the approach and lateral touchdown dispersion on the carrier deck was reduced with the ARI control systems.

N80-29373/1 PC **A06**/MF **A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Open Loop Gust Alleviation.
Final Report, Aug. 1978.
M. Buchstaller, H. Kozakiewicz, R. Menzl, W. Reuter, and J. Schroeder. Oct 79, 111p BMFT-FB-W-79-10
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Previous results, the effectiveness of two alternative gust alleviation concepts, and the technical preacticability of an intended test program were examined. The two concepts are a control system using an elevator alone and a combined system of open and closed loop control. The results examined show that a gust alleviation of 30% is possible with the elevator alone while superposition of the open and closed loop principles improves the pure open loop system, especially at higher frequencies. The practicability study shows that there are neither major technical nor certification problems concerning the realization of a flight test program with the DO 28 TNT as a test aircraft. The symmetrical activation of the ailerons as lift flaps can be realized without feedback to the pilot's control column by a central electrically driven actuator within the fuselage. Elevator control is realized by the trimming spindle. In this case there is a certain feedback to the control column. Signal processing is done digitally.

N80-29767/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Application of Fully Stressed Design Procedures to Redundant and Non-Isotropic Structures.
H. M. Adelman, R. T. Haftka, and U. Tsach. Jul 80, 35p NASA-TM-81842

An evaluation is presented of fully stressed design procedures for sizing highly redundant structures including structures made of composite materials. The evaluation is carried out by sizing three structures: a simple box beam of either composite or metal construction; a low aspect ratio titanium wing; and a titanium arrow wing for a conceptual supersonic cruise aircraft. All three structures are sized by ordinary fully-stressed design (FSD) and thermal fully stressed design (TFSD) for combined mechanical and thermal loads. Where possible, designs are checked by applying rigorous mathematical programming techniques to the structures. It is found that FSD and TFSD produce optimum designs for the metal box beam, but produce highly non-optimum designs for the composite box beam. Results from the delta wing and arrow wing indicate that FSD and TFSD exhibits slow convergence for highly redundant metal structures. Further, TFSD exhibits slow oscillatory convergence behavior for the arrow wing for very high temperatures. In all cases where FSD and TFSD perform poorly either in obtaining nonoptimum designs or in converging slowly, the assumptions on which the algorithms are based are grossly violated. The use of scaling, however, is found to be very effective in obtaining fast convergence and efficiently produces safe designs even for those cases when FSD and TFSD alone are ineffective.

N80-29911/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Effects of Conversation Interference on Annoyance Due to Aircraft Noise.
K. F. Key, and C. A. Powell. Aug 80, 38p NASA-TP-1712, L-13709

The annoyance and interference effects of aircraft flyover noise on face to face conversation were investigated. Twenty 5 minute sessions, each composed of three flyovers, were presented to each of 20 pairs of female subjects in a simulated living room. Flyovers varied in peak noise level (55-79 dB, A-weighted) and spectrum (low or high frequency components). Subjects engaged in conversation for 10 sessions and in reverie for the other 10 sessions, and completed subjective ratings following every session. Annoyance was affected by noise level, but was not significantly different for the two activities of reverie and conversation. A noise level of 77 db was found unacceptable for conversation by 50 percent of the subjects. Conversation interference was assessed by incidence of increased vocal effort and/or interruption of conversation during flyovers. Although conversation interference increased with noise level, the conversation interference measures did not improve prediction of individual annoyance judgments.

N80-30019/7 PC **A05**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
Operational Roles, Aircrew Systems and Human Factors in Future High Performance Aircraft.
P. F. Iampietro. Mar 80, 97p AGARD-CP-266, ISBN-92-835-0262-0
Partly in English and French. Presented at the Aerospace Med. Panels Specialist Meeting, Lisbon, 22-26 Oct. 1979.

No abstract available.

PB80-851793 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Landing Brakes for Airplanes. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 56p NERACIAANT0466
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the evaluation, development and application of various materials used in landing brakes for aircraft. Discussions of antiskid braking systems, disc brakes and properties of tires during and after braking of airplane are also included. (Contains 051 citations.)

PB80-851801 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Landing Brakes for Airplanes. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 123p
NERACUSGNT0466
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the evaluation, development and application of various materials used in landing brakes for aircraft. Discussions of antiskid braking systems, disc brakes and properties of tires during and after braking of airplane are also included. (Contains 104 citations.)

PB80-854649 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Hovercraft. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jun 80, 71p NERACIAANT0740
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the background, development, and applications of hovercraft. Types of craft, engines, automated guideway systems, commercial operation, and military applications of hovercraft are included. (Contains 059 citations.)

PB80-856578 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computer Simulation of Aircraft. June, 1972-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 72-Jun 80,
Howard L. Ogushwitz. Jul 80, 212p
NERACUSGNT0233
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations contain the design and mathematical modeling of aircraft components, avionics, maintenance, and missions, using computers. (Contains 181 citations.)

PB80-859945 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Hovercraft. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 84p NERACEI NT0740
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide reports covering background, development and applications of hovercraft. Types of craft, engines, automated guideway systems, commer-

cial operation and military applications of hovercraft are also included. (Contains 086 citations.)

PB80-910411 PC$5.00/MF$5.00
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Aircraft Accident Report - Transamerica Airlines, Inc., Lockheed L-188, N859U, Salt Lake City, Utah, November 18, 1979.
26 Aug 80, 45p NTSB-AAR-80-11
Paper copy also available on subscription, North American Continent price $50.00/year; all others write for quote.

At 0456 mountain standard time on November 18, 1979, Transamerica Airlines' Logair Flight 3N18, a Lockheed L-188C Electra, departed Hill Air Force Base, Ogden, Utah, with three crewmembers and 27,552 lbs of cargo, on an instrument flight rules (IFR) flight to Nellis Air Force Base, Nevada. After departure from Hill AFB, and while climbing from 12,000 to 13,000 feet, the flight indicated to Salt Lake departure control that they had lost all electrical power, the flight requested no-gyro vectors to visual flight conditions and clearance for an immediate descent to a lower altitude. During the descent the aircraft attained a high airspeed and high rate of descent and disintegrated in flight. The three crewmembers were killed, and the aircraft was destroyed. The wreckage was dispersed along a path about 1 1/2 miles long on an abandoned airport about 4 nmi south of the Salt Lake City International Airport. The National Transportation Safety Board determines that the probable cause of this accident was a progressive failure in the aircraft's electrical system leading to the disabling or erratic performance of some critical flight instruments and flight instrument lighting while the flight was operating in night instrument meteorological conditions. As a result of these conditions, the flightcrew could not resolve the instrumentation anomalies to determine proper aircraft attitude reference, and became disoriented and lost control of the aircraft. The crew's efforts to regain control of the aircraft imposed aerodynamic loads which exceeded design limits of the aircraft and caused to to break up in flight.

1D. Aircraft Flight Control and Instrumentation

AD-A088 066/6 PC **A09**/MF **A01**
IBM Federal Systems Div Owego NY
Fault Tolerant Computer Network Study.
Interim rept. Sep 79-Mar 80,
Webb T. Comfort, T. L. Anthony, T. R. Battle, J. E. Kaufman, and P. M. Kogge. Apr 80, 182p IBM-80-D68-001, AFWAL-TR-80-1046
Contract F33615-79-C-1180

This interim report documents some baseline parameters and considerations for a fault tolerant avionics system. Issues addressed include reliability, computational requirements, fault tolerant techniques, cost effectiveness, error types, computer networks, and analysis techniques. Candidate life-cycle cost models are reviewed for applicability in evaluating fault tolerant architectures, and a study plan for assessment of the cost/effectiveness of fault tolerant techniques is presented. (Author)

AD-A088 377/7 PC **A04**/MF **A01**
National Aeronautics and Space Administration Moffett Field CA Ames Research Center
A Mathematical Representation of an Advanced Helicopter for Piloted Simulator Investigations of Control System and Display Variations.
Technical memo.,
Edwin A. Aiken. Jul 80, 51p NASA-A-8194, NASA-TM-81203, USAAVRADCOM-TM-80-A-2

This report documents a mathematical model of an advanced helicopter; the model is suitable for use in control/display research involving piloted simulation. The general design approach for the six-degree-of-freedom equations of motion is to use the full set of nonlinear gravitational and inertial terms of the equations and to express the aerodynamic forces and moments as the reference values and first-order terms of a Taylor series expansion about a reference trajectory defined as a function of longitudinal airspeed. Provisions for several different specific and generic flight control systems are included in the model. The logic required to drive various flight control and weapon delivery symbols on a pilot's electronic display is also provided. Finally, the model includes a simplified representation of low-altitude wind and turbulence effects. This model has been used in a piloted simulator investigation, recently conducted at Ames Research Center, of the effects of control-system and display variations for an attack helicopter mission. (Author)

AD-A088 527/7 PC **A02**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Helicopter Electro-Optical System Display Requirements: III. The Effects of CRT Display Size and Luminance on Dark Adaptation of Helicopter Pilots.
Technical rept.,
Richard M. Johnson, Aaron Hyman, and Paul A. Gade. Mar 80, 18p Rept no. ARI-TR-443
See also AD-A086 855.

Previous research has indicated that pilots may be able to successfully use a television display of low luminance level as an aid to nighttime nap-of-the-earth helicopter flight. This experiment was conducted to assess the effects of display luminance level and display size on pilots' visual dark adaptation. Brightness matches made by 12 Army helicopter pilots were used to determine the magnitude of the dark-adaptation loss that resulted from viewing a 13-cm and a 26-cm CRT display at relatively bright and dim luminance levels. In the procedure used, one eye was light adapted to the CRT panel display while the other eye remained dark adapted. Then, while the pilots viewed a simulated windscreen display, the luminance setting for the dark-adapted eye was adjusted independently until the display appeared equally bright to both eyes. Windscreen display luminance for the previously light-adapted eye remained fixed at a highlight brightness of 0.01 footlambert (equivalent to full-moon illumination). The larger display was judged to produce the greater dark-adaptation loss, even though the larger display could be successfully used at a lower luminance level. This result might have been due the the greater involvement of the peripheral rod retinal receptor cells when pilots made judgments following exposure to the larger light-adapting display. In such a case, selective attenuation of the blue end of the spectral energy output from the CRT phosphor could reduce the magnitude within 1 second after light adaptation to a dim 26-cm television display showed a 67% loss in the apparent brightness of the windscreen display. This is equivalent to flying under one-third full-moon conditions.

N80-29288/1 PC **A03**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
Wessex Helicopter/Sonar Dynamics Study Arl Program Description and Operation.
N. V. Williams, C. R. Guy, and N. E. Gilbert. Feb 79, 38p ARL-AERO-NOTE-385, AR-001-603

A computer program, representing the dynamic behavior in flight of the Wessex MK.31B helicopter and its antisubmarine warfar (ASW) sonar equipment, is described. The program is intended for operation on a PDP 10 computer and is written in CSMP 10 (ARL) simulation language. Instructions for setting up a particular simulated flight maneuver are given, together with details of program verification.

N80-29295/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
A Head-Up Display Format for Application to Transport Aircraft Approach and Landing.
R. S. Bray. Jul 80, 42p NASA-TM-81199, A-8180

A head up display (HUD) format used in simulator studies of the application of HUD to the landing of civil transport aircraft is described in detail. The display features an indication of the aircraft's instantaneous flightpath that constitutes the primary controlled element. Discrete ILS error and altitude signals are scaled and positioned to provide precise guidance modes when tracked with the flightpath symbol. Consideration is given to both the availability and nonavailability of inertial velocity information in the aircraft.

1E. Air Facilities

AD-A088 157/3 PC **A04**/MF **A01**
Federal Aviation Administration Washington DC Office of Aviation Policy
Description of the Multiple Airport Demand Allocation Model,
B. Campbell, and William R. Fromme. Sep 77, 52p Rept no. FAA-AVP-77-39
Technical Supplement to Rept. no. FAA-AVP-77-36, AD-A052 349.

This report describes a computer model, the Multiple Airport Demand Allocation Model, used by the Federal Aviation Administration (FAA) to determine the relative distribution of air passengers between Washington National, Dulles International, and the Baltimore-Washington International Airports for each of a number of airport policy alternatives which are being considered. This model and the report describing it support the FAA's policy statement for the Metropolitan Washington Airports. The model is based upon the understanding that choice of airports, when more than one is available, is determined largely by the relative attractiveness of each facility to air travelers. Attractiveness of each airport is influenced by the location of the facility relative to population and business centers; the speed and cost of airport access, the availability of convenient flight schedules; and airport capacity limitations among other things. All of these factors vary over time as population growth, access systems, and airport capacities change. (Author)

AD-A088 158/1 MF **A01**
Federal Aviation Administration Washington DC Office of Aviation Policy
Environmental Impacts of Airport Policy Alternatives,
William R. Fromme. Sep 77, 89p Rept no. FAA-AVP-77-40
Data Supplement to Rept. no. FAA-AVP-77-36, AD-A052 349.
Availability: Microfiche copies only.

The Federal Aviation Administration (FAA), as owner and operator of the Metropolitan Washington Airports (Washington National and Dulles International) is issuing a policy statement to guide development and operation of these facilities into the 1990's. The FAA's Metropolitan Washington Airport policy establishes a balance between a complex set of criteria which reflect transportation service, investment requirements and environmental impacts. This report provides much of the environmental assessment supporting the FAA's Metropolitan Washington Airport Policy Statement. The Noise Exposure Forecast (NEF) model is described, NEF data are presented by county and state; results of the airport emission analysis are listed and automobile emission levels are computed. A description of the range of policy options considered is contained in the appendix of the report. (Author)

AD-A088 188/8 PC **A09**/MF **A01**
Southwest Research Inst San Antonio TX Engineering Sciences Div
New Concept Study for Repair of Bomb-Damaged Runways. Volume I. Concept Identification.
Final rept. 1 May 77-24 Jul 78,
E. Jack Baker, Jr., and Ernest P. Bergmann. Sep 79, 186p 02-4891-VOL-1, AFESC/ESL-TR-79-27-VOL-1
Contract F08635-77-C-0154
See also Volume 2, AD-B050 055L.

An in-depth review of bomb crater repair processes and material resulted in the identification of twelve concepts. Each concept is a general solution to the problem of crater repair which is amenable to implementation using numerous combinations of fill and cap materials. In addition to the

study and description of repair processes, an in-depth review of alternate runway strategies is presented. (Author)

AD-A088 203/5 PC **A05**/MF **A01**
Federal Aviation Administration Washington DC Office of Aviation Policy
Metropolitan Washington Airport Investment Requirements,
B. Campbell, T. Chastain, and William Fromme.
Sep 77, 92p Rept no. FAA-AVP-77-38
Technical supplement to Rept. no. FAA-AVP-77-36, AD-A052 349.

The Federal Aviation Administration (FAA), as owner and operator of the Metropolitan Washington Airports, Washington National and Dulles International, is issuing a policy statement of guide development and operation of these facilities into the 1990's. The FAA's Metropolitan Washington Airport policy establishes a balance between a complex set of criteria which reflect transportation service, investment requirements, and environmental impacts. This report presents the results of an analysis of the impact of policy alternatives on capital investment requirements for the Metropolitan Washington Airports. A description of the range of policy options considered is contained in the introduction. The FAA is recommending limiting air carrier aircraft operations at National Airport to 40 per hour, and furthermore, authorizing wide body aircraft at National, with the understanding that wide body service there would average four departures per hour by 1990. Estimated investments at National and Dulles required to support the recommended policy total approximately $119 million in 1976 dollars. Given the uncertainties of investment forecasting, however, there are no significant differences in investment requirements among the policy alternatives evaluated.

AD-A088 264/7 PC **A03**/MF **A01**
Naval Weapons Center China Lake CA
Soil Stabilization Project.
Final rept.,
T. Herling. Mar 79, 34p NWC-TM-3818, GIDEP-E164-2633

Describes an investigation that was undertaken to solve the problem of dust raised by military helicopter landings during field operations. Such dust clouds can cause damage to turbine engines as well as create a visual signature for drawing hostile fire. The goal was to develop a convenient, rapid, and inexpensive technique for stabilizing soil for helicopter/VSTOL landing pads and expeditionary airfield runways. Conventional methods, such as concreting or asphalting, are considered much too expensive and time consuming for tactical use in the field. This report presents a detailed evaluation of the stabilization of soil by application of aqueous latex emulsion. The success of a given emulsion application was judged on the basis of one or more of the eight listed criteria. (Author)

AD-A088 337/1 PC **A03**/MF **A01**
Federal Aviation Administration Washington DC Office of Aviation Policy
Analysis at Air Traffic Delays at Metropolitan Washington Airports,
J. Dratch, and W. R. Fromme. Sep 77, 31p Rept no. FAA-AVP-77-41
Technical Supplement to the Metropolitan Washington Airport Policy Analysis, AD-A052 349.

The Federal Aviation Administration (FAA), as owner and operator of the Metropolitan Washington Airports, Washington National and Dulles International, is issuing a policy statement to guide development and operation of these facilities into the 1990's. The FAA's Metropolitan Washington Airport policy establishes a balance between a complex set of criteria which reflect transportation service, investment requirements, and environmental impacts. Each of the policy alternatives considered has an associated disbenefit that is measured as delay to aircraft. Aircraft delays incur cost penalties to both aircraft operators and passengers. For aircraft operators these delays result in increased costs, for the passengers these delays represent lost time that may have been available for productive or leisure activities. Thus, in the evaluation of the merits of each policy alternative, the airside delay for each mode was determined. This report presents the results of an analysis of the impact of policy alternatives on air traffic delays at the Metropolitan Washington Airports. A description of the range of policy options considered is contained in the appendix of the report. (Author)

2. AGRICULTURE

2B. Agricultural Economics

PB80-178460 MF**$410.00**
National Agricultural Library, Beltsville, MD.
National Agricultural Library; Seven Series on Microfiche.
1978, 2413 MF sheets
Includes seven series: 'Economic Research Service (ERS)', 'Economic Research Service, Foreign (ERSF)', 'Agricultural Economic Research (AER)', 'Farm Index', 'Agricultural Economics Report', 'Agricultural Economics Report, Foreign', and 'Foreign Agricultural Trade of the United States'.
Microfiche copy only.

The report is a complete collection of seven series, 2,063 titles; 2,413 sheets of microfiche on agricultural economics.

PB80-178478 MF**$145.00**
National Agricultural Library, Beltsville, MD.
Economic Research Service (ERS) (April 1971-April 1978).
1978, 739 MF sheets
Also available in complete collection, PB80-178460. Microfiche copy only.

The report is a microfiche collection of the 663 back issues of the U.S.D.A. periodical, Economic Research Service (ERS). The collection covers the period April 1971 through April 1978. The ERS publishes articles on methods and findings of research in agricultural marketing and economics. Also included are agricultural outlooks, situation reports and reprints of special articles.

PB80-178486 MF**$85.00**
National Agricultural Library, Beltsville, MD.
Economic Research Service, Foreign (ERSF) (May 1961-October 1974).
1974, 421 MF sheets
Also available in complete collection, PB80-178460. Microfiche copy only.

The report is a microfiche collection of 369 back issues of the U.S.D.A. periodical, Economic Research Service, Foreign. The collection covers the period May 1961 through October 1974. The ERSF publishes articles on methods and findings of research in agricultural outlooks, situation reports and reprints of special articles. Limited to economic research dealing with other nations.

PB80-178494 MF**$30.00**
National Agricultural Library, Beltsville, MD.
Agricultural Economics Research (AER) (January 1949-January 1978).
1978, 118 MF sheets
Also available in complete collection, PB80-178460. Microfiche copy only.

A microfiche collection of the 114 back issues of the U.S.D.A. Agricultural Economic Research (AER) for the period January 1949 through January 1978. The AER contains technical articles on methods and findings of research in agricultural economics. This collection contains interim reports on work in progress, articles on research methods or techniques, and articles on new areas of research.

PB80-178502 MF**$45.00**
National Agricultural Library, Beltsville, MD.
Farm Index (October 1962-October 1978).
1978, 194 MF sheets
Also available in complete collection, PB80-178460. Microfiche copy only.

A collection of the 193 back issues of the U.S.D.A. monthly periodical, Farm Index. It covers the period from October 1962 through October 1978. This report includes feature stories about implications of selected research findings, a digest of the agricultural outlooks, a table listing figures for 45 leading economic indicators of agricultural development and the general economy, and brief review of ERS research publications.

PB80-178510 MF**$100.00**
National Agricultural Library, Beltsville, MD.
Agricultural Economic Report (1961-1978).
1978, 487 MF sheets
Also available in complete collection, PB80-178460. Microfiche copy only.

A collection of 379 back issues of the U.S.D.A. Agricultural Economics Report. The collection covers the periods 1961 through 1978. The series contains information of economic research including technical presentations of research data that will serve professional workers in the field of agricultural economics.

PB80-178528 MF**$45.00**
National Agricultural Library, Beltsville, MD.
Foreign Agricultural Economic Report (August 1961-August 1978).
1978, 212 MF sheets
Also available in complete collection, PB80-178460. Microfiche copy only.

This is a collection of 140 back issues of the U.S.D.A. periodical, Foreign Agricultural Economics Report. The collection covers the period August 1961 through August 1978. The series contains report of economic research and analyses of foreign trade and situations, including the competitive position of the U.S. agricultural products in given markets and in given areas of the world, and trends and developments in foreign agricultural trade.

PB80-178536 MF**$50.00**
National Agricultural Library, Beltsville, MD.
Foreign Agricultural Trade of the United States (August 1970-1978).
1978, 242 MF sheets
Also available in complete collection, PB80-178460. Microfiche copy only.

This is a collection of 205 back issues of the U.S.D.A. publication, Foreign Agricultural Trade of the United States. The collection covers the period August 1970 through 1978. The reports emphasize current status and outlook for U.S. agricultural trade, including exports under specified Government-financed progress, commercial exports, price developments, and quality indexes for selected commodity groups. Periodic analyses include: U.S. trade with other major exporting and importing countries and trade blocks; Government-progress shipments by commodity and country; annual Plant Quarantine statistics on imports of fruits and vegetables under quarantine; ocean freight rates; shares of production exported, and export shares by States; a world trade section about farm commodity trade and the U.S. Share.

PB80-216328 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Proposed Lamb Import Restrictions: Economic Effects.
Staff rept.,
Eldon Ball, and Daniel Conable. Aug 80, 31p

H.R. 5127 and S.1776 place annual limitations on the importation of lamb. Further, limitations are placed on the proportion of the annual total entering the U.S. in any calendar quarter. The economic impact is measured in a static framework using estimates of demand parameters at both the farm and retail levels. Increases of $30 million in consumer expenditures and $50 million in gross returns to lamb producers are implied. A model of producer behavior is formulated. The results do not indicate a major revival of the U.S. sheep industry is likely.

2C. Agricultural Engineering

DOE/CS-0173 PC **A05**/MF **A01**
Department of Energy, Washington, DC. Office of Conservation and Solar Energy.
Agriculture and Food Processes Branch Program Summary Document.
Jun 80, 88p

The work of the Agriculture and Food Processes Branch within the US DOE's Office of Industrial Programs is discussed and reviewed. The Branch is responsible for assisting the food and agricultural sectors of the economy in increasing their energy efficiency by cost sharing with industry the development and demonstration of technologies industry by itself would not develop because of a greater than normal risk factor, but have significant energy conservation benefits. This task is made more difficult by the diversity of agriculture and the food industry. The focus of the program is now on the development and demonstration of energy conservation technology in high energy use industry sectors and agricultural functions (e.g., sugar processing, meat processing, irrigation, and crop drying, high energy use functions common to many sectors of the food industry (e.g., refrigeration, drying, and evaporation), and innovative concepts (e.g., energy integrated farm systems. Specific projects within the program are summarized. (ERA citation 05:030813)

E80-10235 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Remote Sensing of Total Dry-Matter Accumulation in Winter Wheat.
Technical memo.,
Compton J. Tucker, Brent N. Holben, James H. Elgin, Jr., and James E. McMurtrey, III. Jan 80, 29p NASA-TM-80631
Prepared in cooperation with Agricultural Research Center, Beltsville, MD.

The author has identified the following significant results. Red and photographic-infrared spectral data collected on 21 dates over the growing season with a hand-held radiometer were quantitatively correlated with total dry-matter accumulation in winter wheat. The spectral data were found to be highly related to vigor and condition of the plant canopy. Two periods of drought stress and subsequent recovery from it were readily apparent in the spectral data. Simple ratios of the spectral data compensated for variations in solar intensities and, when integrated over the growing season, explained 79% of the variation in total above-ground accumulation of dry matter.

PB80-857352 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Agricultural Machinery. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 77p NERACUSGNT0425
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the mechanics, design, and performance of agricultural machinery. Citations covering specific farming equipment and mechanical systems, such as harvesters, tractors, feed mixers, seeders, irrigators, tillers, sorters, and sprayers, are included. (Contains 055 citations.)

PB80-857360 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Agricultural Machinery. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 65p NERACEI NT0425
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the mechanics, design, and performance of agricultural machinery. Citations covering specific farming equipment and mechanical systems, such as harvesters, tractors, feed mixers, seeders, irrigators, tillers, sorters, and sprayers, are included. (Contains 062 citations.)

PB80-857378 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Agricultural Machinery. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 57p NERACEDBNT0425
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the mechanics, design, and performance of agricultural machinery. Citations covering specific farming equipment and mechanical systems, such as harvesters, tractors, feed mixers, seeders, irrigators, tillers, sorters, and sprayers, are included. (Contains 043 citations.)

2D. Agronomy and Horticulture

N80-29825/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Thematic Mapper Studies Band Correlation Analysis.
S. G. Ungar, and R. Kiang. Apr 76, 28p NASA-TM-80716

Spectral data representative of thematic mapper candidate bands 1 and 3 to 7 were obtained by selecting appropriate combinations of bands from the JSC 24 channel multispectral scanner. Of all the bands assigned, only candidate bands 4 (.74 mu to .80 mu) and 5 (.80 mu to .91 mu) showed consistently high intercorrelation from region to region and time to time. This extremely high correlation persisted when looking at the composite data set in a multitemporal, multilocation domain. The GISS investigations lend positive confirmation to the hypothesis, that TM bands 4 and 5 are redundant.

PB80-850159 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plant Growth Regulators. February, 1977-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Feb 77-Mar 80,
Edward Ketchledge. Jun 80, 191p NERACFSTNF0209
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains information on the use and effects of plant growth regulators. References citing plant maturation, plant morphology, plant chemical composition, residue analysis, and toxicology are addressed. (Contains 200 citations.)

PB80-850167 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gibberellins. May, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for May 72-Mar 80,
Edward Ketchledge. Jun 80, 195p NERACFSTNF0208
Sponsored in part by National Technical Information Service, Springfield, VA.

References citing the use and effects of the plant growth regulator, Gibberellin, are reviewed. Information on plant maturation, plant morphology, plant chemical composition, and residue toxicology is considered. (Contains 200 citations.)

2E. Animal Husbandry

AD-A088 135/9 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Establishment of A Canine Cell Line: Derivation, Characterization, and Viral Spectrum.
Final rept.,
L. N. Binn, R. H. Marchwicki, and E. H. Stephenson. 4 Oct 79, 8p
Pub. in American Jnl. of Veterinary Research, v41 n6 p855-860 Jun 80.

No abstract available.

AD-A088 138/3 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Enzyme-Linked Immunosorbent Assay for Evaluation of Antibody to Canine Distemper Virus.
Final rept.,
Kerry F. Noon, M. Rogul, L. N. Binn, T. J. Keefe, and Ruth H. Marchwicki. 13 Aug 79, 7p
Pub. in the American Jnl. of Veterinary Research, v41 n4 p605-609 Apr 80.

No abstract available.

DOE/EV/00910-52 PC **A02**/MF **A01**
Minnesota Univ., St. Paul. Coll. of Veterinary Medicine.
Bovine Lymphocytic Leukemia: Studies of Etiology, Pathogenesis and Mode of Transmission. Progress Report, November 1, 1979-October 31, 1980.
D. K. Sorensen. Jun 80, 11p
Contract AS02-76EV00910

The primary project objectives are to elucidate the cause(s) and early pathogenesis of the adult form of lymphosarcoma in cattle. This goal is to be accomplished through experimental transmission of the disease. For these studies large quantities of bovine leukemia virus (BLV) were propagated in short-term, mitogen stimulated, lymphocyte cultures. Cultures containing abundant BLV particles were pooled (33 liters total) and further processed by continuous flow, density gradient, ultracentrifugation. This highly concentrated, cell free, BLV preparation was then used as inoculum for 12 late stage bovine fetuses (inoculated in utero) and two newborn calves. Extensive monitoring studies have been carrid out on these inoculated animals to detect precancerous changes and to obtain a detailed description of the events preceding the development of lymphosarcoma. These extensive records on lymphosarcoma associated blood parameters have established that all of the inoculated animals became persistently BLV infected. However, after more than five years of incubation, no cases of lymphosarcoma developed. Consequently, during the past seven months, five of these well characterized animals have been subjected to frequent BLV re-exposure in order to study BLV-host interactions in previously infected adults and to potentially accelerate tumor formation in these animals. (ERA citation 05:031198)

LA-8227-PR PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Animal Disease Detection Using a New Rapid Method for Monitoring Antigen-Induced Lymphocyte Stimulation, October 1, 1978-September 30, 1979.
E. H. Tate, and L. S. Cram. Jun 80, 15p
Contract W-7405-ENG-36

Lymphocyte proliferation in response to bovine tubercular antigen was measured on blood samples from a herd naturally infected with TB. Determination of single-cell DNA content as a measure of cell proliferation was done by flow cytometry after staining with the DNA-specific stain, propidium iodide. Results of the field testing showed good agreement with other methods for TB detection. Significant progress on the development of a new method for TB detection was made. An increase in the rate of amino acid uptake can be measured within 14 h after treatments of lymphocytes from TB-positive animals with TB antigen. The enhancement does not occur after similar treatment of lymphocytes from TB-negative animals. Ways for optimizing the new test and investigations into other new diagnostic techniques are reported. (ERA citation 05:031204)

SAND-80-7088C PC **A03**/MF **A01**
BDM Corp., Albuquerque, NM.
Risk to Animal Health from Pathogens in Municipal Sludge.
J. G. Yeager. 1980, 29p CONF-800495-1

Contract AC04-76DP00789
Evaluation of health risks associated with animal feeding and/or land application of municipal sludge conference, Tampa, FL, USA, 29 Apr 1980.

Public and legislative concerns directed toward resource and materials recycling have stimulated widespread interest in the use of sewage sludge to improve the fertility and water-holding capacity of soil. The use of sludge on land to grow crops for human or animal consumption has raised concerns over the health hazards from the sludge pathogens. Relatively little attention has been focused on the risks to the health of animals that may graze on sudge-amended pastures or consume feedstuffs grown on these lands. Concern about the animal health risks is justified because economic losses from animal disease that may be associated with the use of sewage sludge could be quite large. In fact, these losses may exceed poential economic losses from human disease associated with sludge use. This review emphasizes the risk to animal health from zoonotic and human pathogens in sludge and from specific animal pathogens that may be found in sludge. (ERA citation 05:031203)

2F. Forestry

DOE/EV/02283-1 PC **A02**/MF **A01**
Michigan State Univ., East Lansing.
Response of a Forest Ecotone to Ionizing Radiation. Progress Report, October 15, 1979-October 14, 1980.
P. G. Murphy, and R. R. Sharitz. Jul 80, 16p
Contract AC02-76EV02283

Compositional and structural characteristics of three forest types, including aspen dominated, maple-birch dominated, and an intervening ecotone, were studied before and after irradiation in northern Wisconsin. Irradiation occurred during the summer of 1972. By the summer of 1973 the density of viable tree seedlings at 10 m from the radiation source was substantially reduced in all three areas relative to the preirradiation densities of 1971. As of the summer of 1979, establishment of tree seedlings continued to be inhibited by the vigorous development of ground vegetation. In most respects, the ecotone has shown properties and responses to radiation intermediate to those observed in the aspen and maple-birch areas. The rate and compositional characteristics of succession in the ecotone relative to aspen and maple-birch forest types is presently under study. (ERA citation 05:031211)

DOE/EV/10040-1 PC **A05**/MF **A01**
Institute of Ecology, Indianapolis, IN.
Role of Temperate Zone Forests in the World Carbon Cycle: Problem Definition and Research Needs.
T. V. Armentano, and J. Hett. 1979, 77p
Contract AC02-79EV10040

The proceedings of a workshop on carbon uptake and losses from temperate zone forests are presented. The goals of the workshop were to analyze existing data on growth and utilization of the temperate zone forest carbon pool and to identify further research needs in relation to the role of temperate forests in the global carbon cycle. Total standing stock and growth recovery transients were examined for most of the temperate region over a period from pre-settlement times to the present, with emphasis on the last three decades. Because of data availability, certain regions and topics were covered more in detail than others. Forest inventory data from most of the commercial timberlands of the north temperate zone suggest these forests have functioned over the past several decades as an annual sink for about 10 exp 9 metric tons of carbon. Thus, net growth of these forests has withdrawn carbon from the atmosphere at a rate equivalent, approximately, to 50% of the annual rise in atmospheric carbon. Various data inadequacies make this estimate probably no more precise than plus or minus half of the value. Analysis of growth and vegetation changes in New England and the southeastern United States shows that forest biomass has partly recovered since extensive clearing took place in the 18th and 19th centuries. This regrowth represents a net withdrawal of carbon (carbon sink) from the atmosphere in recent decades, although the difference in pool size between present and original forests means that, in the longer term, the two regions have functioned as carbon sources. (ERA citation 05:031110)

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

N80-30240/9 PC **A03**/MF **A01**
Illinois Univ., Urbana. Astronomy Dept.
Illinois Occultation Summary, 1. 1977 - 1978.
R. Radick, and D. Lien. 19 Feb 80, 31p NASA-CR-163407
Contracts NGR-14-005-176, DE-AC02-76ER-03077

Instrumentation and data acquisition techniques used to record lunar occultations at the University of Illinois Prairie Observatory are described. Tables and graphs summarize data from 64 events which include 30 observations of stars brighter than 7th magnitude, 40 reappearances, 4 angular diameter measurements, 8 observations of binary stars, and 6 observations which may indicate multiplicity.

N80-30241/7 PC **A02**/MF **A01**
Colorado Univ., Boulder. Lab. for Atmospheric and Space Physics.
The Rate of Mass Loss and Variations in the Wind from the Be Star delta Centauri.
T. P. Snow, Jr., W. R. Oegerle, and R. S. Polidan. 1980, 19p NASA-CR-163427
Contract NAS5-23576, Grant NSG-5355

Copernicus ultraviolet scans of the Be star delta Centauri obtained in 1976 and 1979, show a significant variation in the Si III lambda 1206 profile, The strong asymmetry that was present in 1976 had disappeared by 1979. The Si IV lambda 1400 doublet was also asymmetric in 1976, but was not observed in 1979. A quantitative fit of the line shapes to theoretical wind profiles shows that the mass-loss rate in 1976 was 2 x 10 to the minus 8th power/yr, and that the rate of mass loss in Si III was at least one order of magnitude less in 1979. It is not possible to determine whether the variation represented an overall change in the lass-loss rate, or whether it was due to a change in the ionization balance. The profile fitting procedure resulted in the adoption of assumed underlying photospheric Si III and Si IV profiles, and the equivalent widths measured from these profiles are most consistent with T sub eff between 30,000 and 35,000 K, somewhat hotter than implied by the spectral classification normally assigned to this star. The ultraviolet photospheric line widths, coupled wit published theoretical analyses of rotational gravitational darkening, imply an intrinsic equatorial velocity of about 310 km/sec and an angle of inclination of the rotational axis to the line of sight of i is less than or equal to 44 deg.

N80-30242/5 PC **A02**/MF **A01**
Cambridge Univ. (England). Inst. of Astronomy.
Extragalactic H 2 Regions in the Uv: Implications for Primeval Galaxies and Quasars.
D. L. Meier, W. K. Kellogg, and R. Terlevich. 1980, 14p NASA-CR-163430
Grant NSG-5384, Contract NSF AST-78-21453

Three extragalactic regions of rapid star formation with red shifts great enough to separate the L alpha region from geocoronal L alpha were observed with the IUE satellite. Only the low metal abundance object had detectable L alpha emission. L alpha is therefore expected to be weak or absent in collapsed primeval galaxies. The detected object has a L alpha H beta identical to that of quasars.

N80-30243/3 PC **A02**/MF **A01**
Max-Planck-Institut fuer Astronomie, Heidelberg (Germany, F.R.). Koenigstuhl.
Liquid Helium Cooled Infrared Telescope for Astronomical and Atmospheric Measurements on Board Spacelab.
Final Report.
D. Lemke, G. Klipping, and N. Roemisch. Nov 79, 19p BMFT-FB-W-79-17
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

As a complement to the large infrared telescope on board Spacelab (LIRTS), a smaller liquid helium cooled infrared telescope for observation in the far infrared is scheduled for flight on the Spacelab D4 mission in 1983 for use in a combined study comprising both astrophysical and aeronomical measurements. The telescope is described as well as the cooling system which presents the possibility of studying fundamental aspects of helium 2 physics.

N80-30244/1 PC **A05**/MF **A01**
Institut fuer Angewandte Geodaesie, Frankfurt am Main (Germany, F.R.).
Simultaneous Determination of the Components of Vertical Declination, (Xi and eta, Using a Prism Astrolabe. Part 4: Observations in the Noerdlinger Ries During 1970 Simultanbestimmungen der Lotabweichungskomponenten xi und eta MIT Dem Prismenastrolabium. 4: Beobachtungen im Noerdlinger Ries im Jahr 1970.
A. Roedde. 1979, 86p SER-B-237-PT-4, ISSN-0071-9196
Text in German; English Summary. Original Contains Color Illustrations.

Astronomic determinations of longitude and latitude, performed simultaneously using a Ni-2 astrolabe, at 12 stations on a meridian profile across the Noerdlinger Ries are reported. The declinations of the vertical for the star system RE 1950 were calculated using a computer program and are given in tabular form.

N80-30245/8 PC **A06**/MF **A01**
Institut fuer Angewandte Geodaesie, Frankfurt am Main (Germany, F.R.).
Simultaneous Determination of the Components of Vertical Declination, xi and eta, Using a Prism Astrolabe. Part 5D: Observations Along 48 Deg Latitude During 1974 Simultanbestimmungen der Lotabweichungskomponenten xi und eta MIT Dem Prismenastrolabium. 5D: Beobachtungen im 48 Brietengrad im Jahr 1974.
A. Roedde. 1979, 117p SER-B-238-PT-5D, ISSN-0071-9196
Text in German; English Summary.

Astronomic determinations of longitude and latitude performed simultaneously using a Ni-2 astrolabe at 17 stations on a geoid profile along 48 deg latitude are reported. The declinations of the vertical for the star system RE 1950 were calculated using a computer program and are given in tabular form.

N80-30246/6 PC **A04**/MF **A01**
Institut fuer Angewandte Geodaesie, Frankfurt am Main (Germany, F.R.).
Simultaneous Determination of the Components of Vertical Declination, xi and eta, Using a Prism Astrolabe. Part 5E: Observations Along 48 Deg Latitude During 1963 Simultanbestimmungen der Lotabweichungskomponenten xi und eta MIT Dem Prismenastrolabium. 5E: Beobachtungen im 48 Breitengrad im Jahre 1963.
A. Roedde. 1979, 63p SER-B-239-PT-5E, ISSN-0071-9196

Text in German; English Summary.

Astronomic determinations of longitude and latitude performed simultaneously using a Ni-2 astrolabe at 13 stations on a geoid profile along 48 deg latitude are reported. The declinations of the vertical for the star system RE 1950 were calculated using a computer program and are given in tabular form.

N80-30247/4 PC **A05**/MF **A01**
Institut fuer Angewandte Geodaesie, Frankfurt am Main (Germany, F.R.).
Simultaneous Determination of the Components of Vertical Declination, xi and eta, Using a Prism Astrolabe. Part 5F: Observations Along 48 Deg Latitude During 1975 Simultanbestimmungen der Lotabweichungskomponenten xi and eta MIT Dem Prismenastrolabium. 5F: Beobachtungen im 48 Breitengrad im Jahre 1975.
A. Roedde. 1979, 86p SER-B-240-PT-5F, ISSN-0071-9196
Text in German; English Summary.

Astronomic determinations of longitude and latitude performed simultaneously using a Ni-2 astrolabe at nine stations on a geoid profile along 48 deg latitude are reported. The declinations of the vertical for the star system RE 1950 were calculated using a computer program and are given in tabular form.

PB80-227671 Not available NTIS
National Bureau of Standards, Washington, DC.
HEAO 1 Observations of Active Coronae in Main-Sequence and Subgiant Stars.
Final rept.,
F. M. Walter, J. L. Linsky, S. Bowyer, and G. Garmire. 1980, 5p
Contract NAS8-33084
Pub. in Astrophysical Jnl. 236, pL137-L141, 15 Mar 80.

The authors have searched the HEAO1 data for evidence of X-ray emission from 105 bright late-type stars of luminosity class IV and V, selected on the basis of indirect optical evidence of the presence of a hot corona. Six of the target stars, were detected at the 3 sigma level and 15 were coincident with 2 sigma X-ray sources. On a statistical basis no more than 5 of these 21 sources are spurious. The authors conclude that they are observing the most active coronae of late-type stars which are not members of close binary systems. The RS CVn systems discovered to date seem to form a distinct class of coronal X-ray sources, but the lowest X-ray luminosity members of the group, of which Capella may be the prototype, appear to overlap the domain of these single stars with active coronae. The data do not fit the coronal model of Gorenstein and Tucker (1976), but they are consistent with the coronal loop of Rosner et al. as extended by Walter et al.

3B. Astrophysics

AD-A088 220/9 PC **A11**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
An Atlas of Selected Multi-Frequency Radio Bursts from the Twentieth Solar Cycle.
Environmental research paper,
William R. Barron, Victor L. Badillo, Edward W. Cliver, and Donald A. Guidice. 2 Apr 80, 228p
Rept nos. AFGL-TR-80-0098, AFGL-ERP-699

Illustrations or reconstructions of the analog records of significant and interesting solar radio bursts observed during Solar Cycle 20 at the AFGL Sagamore Hill Radio Observatory in Hamilton, Massachusetts, and the Manila Observatory in the Philippines are presented. Many of the illustrated burst records were associated with the emission of energetic solar protons and subsequent disturbances to the ionosphere and the geomagnetic field. (Author)

CEA-CONF-4627 PC **A04**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service d'Electronique Physique.
Phenomenology of Extragalactic High Energy Sources.
C. E. Ryter. 1979, 74p
U.S. Sales Only.

The course is divided in two main bodies: Chapters 1 and 2 deal with some of the fundamental properties of the production of high energy radiation, while chapter 3 is devoted to the observations of active galaxies; chapter 4 presents the X-ray emission of clusters of galaxies and the sky background. (Atomindex citation 11:509802)

EFI-302(27)-78 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Determination of the Electron-Proton Shower Energy by the Cherenkov Total Absorption Spectrometer Together with Spark Chambers.
A. S. Aleksanyan, T. L. Asatiani, I. B. Vartazaryan, A. O. Gasparyan, and V. A. Ivanov. 1978, 15p
In Russian.
U.S. Sales Only.

Studied is the dependence of the pulse amplitude being received from the Cherenkov total absorption spectrometer on the thickness of the lead converter located before it. Considered is the possibility of increase of the accuracy of determination of the electron-proton shower energy by the Cherenkov total absorption spectrometer together with spark chambers. It is established experimentally that the best correlation between the number of particles registered by spark chambers and energy released in the Cherenkov counter is obtained under the condition taking into account the sum of particles in all sections, but not a number of particles after their passage through the total converter layer. The formulas allowing to calculate the true energy of the incident electrons and protons are obtained empirically. (Atomindex citation 11:497292)

INIS-mf-5471 PC **A08**/MF **A01**
Amsterdam Univ. (Netherlands).
Optical Studies of Massive X-Ray Binaries.
E. J. Zuiderwijk. 20 Jun 79, 170p
Thesis.
U.S. Sales Only.

Photometric and spectroscopic studies of several optical counterparts of massive X-ray binaries are presented. Subjects of study were the binary systems:HD77581/4U0900-40 (Vela X-1), HD153919/4U1700-37, Wray 977/4U1223-62 and Sk160/4U0115-74. (Atomindex citation 11:506996)

LBL-10934 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Polarization of the Cosmic Background Radiation.
P. M. Lubin. Mar 80, 95p
Contract W-7405-ENG-48
Thesis.

The results and technique of a measurement of the linear polarization of the Cosmic Background Radiation are discussed. The ground-based experiment utilizes a single horn (7 exp 0 beam width) Dicke-type microwave polarimeter operating at 33 GHz (9.1 mm). Data taken between May 1978 and February 1980 from both the northern hemisphere (Berkeley Lat. = 38 exp 0 N) and the southern hemisphere (Lima Lat. = 12 exp 0 S) show the radiation to be essentially unpolarized over all areas surveyed. For the 38 exp 0 declination data the 95% confidence level limit on a linearly polarized component is 0.3 mK for the average and 12 and 24 hour periods. Fitting all data gives the 95% confidence level limit on a linearly polarized component of 0.3 mK for spherical harmonics through third order. Constraints on various cosmological models are discussed in light of these limits. (ERA citation 05:029767)

LUIP-7909 PC **A02**/MF **A01**
Lund Univ. (Sweden).
Measurements of Cosmic Ray Iron Isotopes in an Emulsion-Plastic Detector.
R. Scherzer, W. Enge, R. Beaujean, S. Hertzman, and K. Kristiansson. Aug 79, 13p CONF-790765-5
10. international conference on solid state nuclear track detectors, Lyons, France, 2 Jul 1979.
U.S. Sales Only.

Nuclear emulsion and cellulose-nitrate plastic detectors have been combined in a detector system for mass determination of galactic cosmic ray iron particles. The detector has been exposed and 17 iron nuclei have been indentified with an accuracy of 0.3-0.4 AMU. The energy interval was 500-750 MeV/nucleon at the top of the atmosphere. The mass analysis is based on measurements of conelengths in Kodak plastics and residual ranges in plastics and emulsion. Significant sensitivity variations between the plastic sheets were discovered. The high mass resolution was obtained by applying corrections to overcome the inhomogeneous detector response. (Atomindex citation 11:509804)

N80-30261/5 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
History of the Mass of Mercury.
R. A. Lyttleton. 1 Aug 80, 36p NASA-CR-163438, JPL-PUB-80-44
Contract NAS7-100

A historical investigation reveals that Newcomb omitted to complete the calculation for the mass of mercury which would have given 8,405,291(-1), but instead arbitrarily adopted a value of 6,000,000(-1). This baseless figure 6000000(-1) became generally accepted and adopted in subsequent attempts to improve the mass. That only small changes have emerged is likely to be no more than a consequence of relying on a least squares process. Reduction of the Mercury mass to 9,000,000(-1) would alter theoretical angular positions of Venus by less than inherent observational errors, but the theoretical distances would be changed by amounts probably capable of detection by radar means.

N80-30267/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Influence of Magnetic Pressure on Stellar Structure: A Mechanism for Solar Variability.
K. H. Schatten, and A. S. Endal. 1980, 14p
NASA-TM-81129

A physical mechanism is proposed that couples the Sun's dynamo magnetic field to its gravitational potential energy. The mechanism involves the isotropic field pressure resulting in a lifting force on the convective envelope, thereby raising its potential energy. Decay of the field due to solar activity allows the envelop to subside and relaeses this energy, which can augment the otherwise steady solar luminosity. Equations are developed and applied to the Sun for several field configurations. The best estimate model suggests that uniform luminosity variations as large as 0.02% for half a sunspot cycle may occur. Brief temporal variations or the rotation of spatial structures could allow larger excursions in the energy released.

PB80-216435 Not available NTIS
National Bureau of Standards, Washington, DC.
Direct Measurement of Solar Luminosity Variation.
Final rept.,
R. C. Willson, C. H. Duncan, and J. Geist. 1980, 3p
Pub. in Science 207, p177-179, 11 Jan 80.

Two rocket flights of an absolute pyrheliometer, separated by 30 months, indicate an increase in solar luminosity (solar constant) of 0.4 percent. The significance of this result is considered in light of the instrument performance during the rocket flights and of pre- and postflight intercomparisons with independently maintained pyrheliometers. There is a high probability that the measured difference is real. Additional observations are required to determine whether the difference results from random fluctuations in solar luminosity, a nonrandom change of short duration, or a sustained change that has climatological significance.

PB80-221559 Not available NTIS
National Bureau of Standards, Washington, DC.
HEAO 1 Observations of X-Ray Emission from Flares on dMe Stars.
Final rept.,
S. M. Kahn, J. L. Linsky, K. O. Mason, B. M. Hasich, and C. S. Bowyer. 1 Dec 79, 5p

Contract NAS8-33084
Pub. in Astrophysical Jnl. 234, n2 pL107-L111, 1 Dec 79.

The authors report the detection of two X-ray flares from each of the nearby dMe stars, AT Mic and AD Leo, with the A-2 experiment on board HEAO 1. A spectrum obtained during the brighter AT Mic flare, the first X-ray spectrum of a stellar flare, is well matched by a thermal model. The estimated L(x)/L(opt) ratios exceed unity and are inconsistent with Mullan's flare model. The authors propose several scenarios to explain this discrepancy.

PB80-225295 PC **A06**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 430, June 1980. Part II (Comprehensive Reports). Data for December 1979,
Helen E. Coffey. Jun 80, 115p SGD-430-PT-2, NOAA-80072904
See also Part 1, PB80-225303, and PB80-212707.

In addition to an index for 1979-1980, this issue of comprehensive reports provides data for December 1979 on: solar radio emission, energetic solar particles and plasma and solar x-ray radiation.

PB80-225303 PC **A09**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 430, June 1980. Part I (Prompt Reports). Data for May 1980, April 1980,
Helen E. Coffey. Jun 80, 178p SGD-430-PT-1, NOAA-80072903
See also Part 2, PB80-225295.

In addition to an index for 1979-1980, this prompt report provides data for May 1980 on: alert periods, daily solar indices, solar flares, solar radio emission, solar wind measurements, coronal holes, inferred interplanetary magnetic field polarities, mean solar magnetic field and Boulder Geomagnetic Substorm Log. It also provides data for April 1980 on: daily solar activity centers, sudden ionospheric disturbances, spacecraft observations, solar radio emission, cosmic rays, geomagnetic indices and radio propagation indices.

PB80-228968 Not available NTIS
National Bureau of Standards, Washington, DC.
The Spectrum of the Nebulosity Around the Symbiotic Long-Period Variable, R Aquarii.
Final rept.,
G. Wallerstein, and J. L. Greenstein. Jun 80, 8p
Pub. in Publications of the Astronomical Society of the Pacific 92, p275-283 Jun 80.

Multichannel spectrophotometric and SIT spectrograph data are reported for R Aqr during its deep minimum of September 1977. Line identifications and fluxes are presented. The emission lines are analyzed to yield the following parameters. The reddening, which must be circumstellar at b = -70 deg, is 0.67 in (B-V). From the ratio of Balmer continuum emission to H Beta an electron temperature near 11,000 K is derived, with observational uncertainties that allow values from 9000 K to 16,000 K. A model of R Aqr with a white dwarf or O subdwarf accreting material that is lost by the long-period variable is discussed but to date there is no direct evidence that two separate stars are present. The evidence that the maxima were suppressed when the hot source was bright is used to question the binary hypothesis and to suggest that R Aqr may be a single star with a magnetically active region.

SLAC-Trans-0192 PC **A02**/MF **A01**
Akademiya Nauk SSSR, Moscow. Fizicheskii Inst.
Cosmological Models of the Universe with Rotation of Time's Arrow.
A. D. Sakharov. May 80, 12p
Contract AC03-76SF00515
D.

The paper treats cosmological models of the universe with rotation of time's arrow. The hypothesis of cosmological CPT symmetry previously advanced by the author and the hypothesis of a many-sheeted open model with negative space curvature and an invariant combined charge are presented. The statistical paradox of the reversibility and baryon asymmetry of the universe is discussed with respect to these models. The fundamental possibility of estimating (in absolute magnitude) the serial number of the expansion-contraction cycle corresponding to the present stage of evolution of the universe is pointed out for the many-sheeted model with rotation of time's arrow. The small dimensionless quantity 10 exp -58 = delta exp 2 / alpha exp 2 (where alpha is the hyperbolic radius and delta exp -3 the entropy density), which characterizes the average space curvature of the universe, is explained as a result of the evolution of the universe in the course of many successive expansion-contraction cycles. (ERA citation 05:031259)

UCRL-84544 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Models for Type I Supernovae.
S. E. Woosley, T. A. Weaver, and R. E. Taam. 17 Jun 80, 19p CONF-800480-3
Contract W-7405-ENG-48
ASCOT program planning meeting, Gettysburg, PA, USA, 15 Apr 1980.

Two rather disjoint scenarios for Type I supernovae are presented. One is based upon mass accretion by a white dwarf in a binary system. The second involves a star having some 8 to 10 times the mass of the sun which may or may not be a solitary star. Despite the apparent dissimilarities in the models it may be that each occurs to some extent in nature for they both share the possibility of producing substantial quantities of exp 56 Ni and explosions in stars devoid of hydrogen envelopes. These are believed to be two properties that must be shared by any viable Type I model. (ERA citation 05:029769)

3C. Celestial Mechanics

AD-A088 095/5 PC **A04**/MF **A01**
Naval Surface Weapons Center Dahlgren VA
Earth's Rotation in 1975-1979 Based on Doppler Satellite Observations.
Final rept.,
Richard J. Anderle. May 80, 60p Rept no. NSWC/TR-80-232

Doppler observations of Navy Navigation Satellites have been used to determine changes in earth's rotation during the years 1975-1979. Annual and semiannual variations determined from the Doppler observations are not valid due to the neglect of the gravitational effects of atmospheric and ocean tides on the orbit of a satellite. However, variations with periods of 50 to 120 days are correlated well with astronomic results. These variations integrate to amplitudes of two or more milliseconds in UT-1. Shorter period variations only occasionally correlate with astronomic results. There are also occasional conflicts in phases; and, generally, there is only about a 50-percent agreement in amplitude of the shorter period variations obtained from observations of different satellites. (Author)

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A087 948/6 PC **A03**/MF **A01**
Rice Univ Houston TX
Quantitative Simulation of a Magnetospheric Substorm. 3. Plasmaspheric Electric Fields and Evolution of the Plasmapause.
Scientific rept.,
R. W. Spiro, M. Harel, R. A. Wolf, and P. H. Reiff. 25 Jan 80, 48p SCIENTIFIC-4, AFGL-TR-80-0130
Contract F19628-77-C-0005

Results of the Rice University substorm simulation have been used to investigate the penetration of substorm-associated electric fields into the plasmasphere. Near 4 R(E) in the equatorial plane, our time-dependent electric field model is characterized by eastward components in the dusk-midnight local time sector and westward components after midnight. Except for a small region just before dusk the model predicts eastward electric field components throughout the daytime sector. The characteristic radial component is directed inward at all local times except for a small region just after dawn. These results compare favorably with available whistler and incoherent scatter measurements obtained during magnetically disturbed periods. By assuming an initial plasmapause shape and by following the computed E x B drift trajectories of plasma flux tubes from that initial boundary we have examined the short-term evolution of the plasmapause during the substorm-like event of 19 September 1976. We find that narrow filamentary tails can be drawn out from the plasmasphere near dusk within hours of substorm onset. These tail-like appendages to the plasmasphere subsequently drift rapidly from the dust sector toward the daytime magnetopause. Investigation of the large-scale time-dependent flow of plasma in the evening sector indicates that some mid-latitude plasma flux tubes that drift eastward past the dusk terminator reverse their motion between dusk and midnight and begin to drift westward toward dusk. Such time-dependent changes in flow trajectories may be related to the formation of F-region ionization troughs. (Author)

AD-A088 127/6 PC **A02**/MF **A01**
Washington Univ Seattle Space Sciences Div
2 - 12 Minute Quasi-Periodic Variations of 50 - 1,000 keV Trapped Electron Fluxes Detected in the Afternoon Magnetosphere. 1. Physical Characteristics,
George K. Parks, Chin S. Lin, and John R. Winckler. 2 Sep 75, 19p
Contract N00014-67-A-0103-0039, Grant NSF-DES74-02762
Prepared in cooperation with Minnesota Univ., Minneapolis. School of Physics and Astronomy. Contract NAS-9542. Sponsored in part by Grant NGR-48-002-154. See also AD-A088 128.

Physical properties of electron variations of period in the range 2 - 12 minutes detected in the afternoon magnetosphere at synchronous altitudes by the University of Minnesota electron spectrometer on the ATS-1 are presented. We find that in the energy interval 50 keV to 1 meV, most of the electron variations are correlated with the intensity of the local magnetic field. This correlation exists down to a few minutes time scale. The pitch-angle analysis shows that the enhancement of fluxes occur primarily at large pitch-angles. We show in Part 2 of this series of papers that the electron variations can be accounted for by adiabatic causes. (Author)

AD-A088 128/4 PC **A02**/MF **A01**
Washington Univ Seattle Space Sciences Div
2 - 12 Minute Quasi-Periodic Variations of 50 - 1000 keV Trapped Electron Fluxes Detected in the Afternoon Magnetosphere. 2. Theory of Adiabatic Modulations,
George K. Parsk, Chin S. Lin, and John R. Winckler. 2 Sep 75, 20p
Contract N00014-67-A-0103-0039, Grant NSF-DES74-02762.
Prepared in cooperation with Minnesota Univ., Minneapolis. School of Physics and Astronomy. Contract no. NAS-9542. Sponsored in part by Grant NGR-48-002-154. See also AD-A088 127.

A simple adiabatic theory of particle modulations is derived. Assuming that the perturbed magnetic field is time dependent but homogenous in space along the dipole direction, an expression for the change of particle fluxes in the equatorial plane is derived in terms of measurable quantities. We show here that the derived expression agrees well

with observed characteristics of trapped electron fluxes measured by the University of Minnesota electron spectrometer on the ATS-1. In particular, quasi-periodic modulations of paper 1 are satisfactorily explained. (Author)

AD-A088 215/9 PC **A11/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
Atmospheric Transmittance/Radiance: Computer Code LOWTRAN 5.
Environmental research papers,
F. X. Kneizys, E. P. Shettle, W. O. Gallery, J. H. Chetwynd, Jr., and L. W. Abreu. 21 Feb 80, 228p Rept nos. AFGL-TR-80-0067, AFGL-ERP-697

This report describes a computer code for predicting atmospheric transmittance and the thermal radiation emitted by the atmosphere and earth from 350 to 40,000 per cm at a spectral resolution of 20 per cm. The program is based on the LOWTRAN 4 (1978) computer code. New altitude and relative-humidity dependent aerosol models and new fog models are included in the code. In addition, the new code structure consists of a main program and 19 subroutines. The computer code contains representative (geographical and seasonal) atmospheric models and representative aerosol models with an option to replace them with user-derived or measured values. The program can be run in one of two modes, namely, to compute only atmospheric transmittance or both atmospheric transmittance and radiance for any given slant path geometry. (Author)

AD-A088 336/3 PC **A03/MF A01**
New Mexico State Univ Las Cruces Dept of Physics
Atmospheric Extinction Model Modification Analysis.
Final rept.,
August Miller, and Edward Burlbaw. Sep 79, 27p
Contract DAAD07-79-M-6275

This document summarized modifications of ASL supplied atmospheric extinction models carried out at NMSU. The particular modifications which have been examined and completed are the following: (1) Revision of the line-by-line model (ATRAN) to include an additional line-profile (the 'Gross' profile) for use at near-millimeter wavelengths, (2) Revision of the single-scattering aerosol code AGAUSX to provide for user supplied inputs and program outputs describing the polarization properties of incident and scattered radiation, (3) Development and demonstration of a code for calculating, tabulating and plotting the results of Mie calculations using those WSMR facilities which are routinely available to ASL, (4) Adaptation of an ASL supplied 'continued fraction' approach to Bessel function calculations as a substitute for the forward recursion methods previously employed by subroutine MIEGX in program AGAUSX, and (5) Further examination of the effects of relative humidity on extinction by hygroscopic aerosols using an FS smoke model.

AD-A088 365/2 PC **A03/MF A01**
SRI International Menlo Park CA
Magnetic-Field-Aligned Characteristics of Plasma Bubbles in the Nighttime Equatorial Ionosphere.
Topical rept. no. 3, 2 Apr-1 Jul 79,
Roland T. Tsunoda. 1 Jul 79, 33p DNA-5150T, AD-E300 879
Contract DNA001-79-C-0153

During the past three years, the Defense Nuclear Agency (DNA) has conducted a series of rocket experiments from the Kwajalein Atoll, Marshall Islands, to investigate the character of intense, scintillation-producing irregularities that occur in the nighttime equatorial ionosphere. Because the source mechanism of equatorial irregularities, believed to be the Rayleigh-Taylor instability, is analogous to that which generates plasma-density striations in a nuclear-induced environment, there is considerable interest in the underlying physics that controls the characteristics of these irregularities. A primary objective of ALTAIR investigations of equatorial irregularities is to seek an understanding of the underlying physics by establishing the relationship between meter-scale irregularities (detected by ALTAIR), and large-scale plasma depletions (or 'bubbles') that contain the kilometer-scale, scintillation-producing irregularities. An important application of this relationship has been the use of ALTAIR as a real-time locator of intense irregularities for the purpose of rocket launch criteria.

AD-A088 457/7 PC **A02/MF A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
Evidence of an Ionospheric Reflecting Layer Below the Classical D Region,
J. E. Rasmussen, P. A. Kossey, and E. A. Lewis. 24 Jan 79, 10p Rept no. RADC/ETR-80-0026
Pub. in Jnl. of Geophysical Research, v85 nA6 p3037-3044, 1 Jun 80.

No abstract available.

AD-A088 481/7 PC **A02/MF A01**
Regis Coll Research Center Weston MA
Observations of Field-Aligned Currents in Associated with Strong Convection Electric Fields at Subauroral Latitudes.
Rept. for 1 Aug 79-30 May 80,
Frederick J. Rich, William J. Burke, Michael C. Kelley, and Michael Smiddy. 25 Sep 79, 8p
SCIENTIFIC-6, AFGL-TR-80-0219
Contract F19628-77-C-0122
Pub. in Jnl. of Geophysical Research, v85 nA5 p2335-2340, 1 May 80.

No abstract available.

N80-29545/4 PC **A05/MF A01**
Indian Space Research Organization, Bangalore.
Total Electron Content Data Collected During Ats-6 Radio Beacon Experiments in India, August 1975 to July 1976.
Dec 78, 88p ISRO-SN-07-78

Total electron count data from ATS 6 beacon transmission are presented in tabular form. The data sheets include the following: satellite used; frequencies used; technique employed; geographic latitude and longitude of the subionospheric point at the mean field height; elevation angle at the observing station; conversion factor use; and mean field height. Guidelines for data sheet format are included.

N80-29642/9 PC **A04/MF A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Study of a Helium Gas Filling Device for Astronomical Experiments.
Final Report, Dec. 1978.
B. Hinderer, H. Koch, and K. Thalheimer. Oct 79, 58p BMFT-FB-W-79-12
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A gas pumping device useful for cyclic filling of optical analyzers up to a defined pressure was designed, manufactured, and successfully tested after fundamental investigations of different concepts and their components. The three development phases are described in detail. The final design of the breadboard model is based on the requirements of an astronomic sounding rocket experiment essentially demanding pressurization of a previously evacuated volume within an appointed time.

N80-29939/9 PC **A09/MF A01**
Indian Space Research Organization, Bangalore.
Space Science Research in India. Part 1: Earth's Environment and Geomagnetism.
P. Sharma, D. P. Sharma, M. S. Narayanan, and S. K. Mattoo. Oct 78, 176p ISRO-SR-06-78

Space science research activities being conducted at various institutions in India are reported and important scientific results obtained since 1965 are summarized. All branches of aeronomy and astronomy (including astrophysics) studied either by ground-based or spaceborne techniques are considered as well as theoretical/analytical studies. Categories covered include: meteorology; atmospheric emissions; D-region; E-region; F-region and topside ionosphere; total electron content of the ionosphere; ionospheric scintillations; ionospheric drifts; gravity waves and travelling ionospheric disturbances; lunar tidal variations; radio communications; geomagnetism; and the Earth's magnetosphere.

N80-29940/7 PC **A03/MF A01**
Texas Univ. at Dallas, Richardson. Center for Space Sciences.
The Relationships Between High Latitude Convection Reversals and the Energetic Particle Morphology Observed by the Atmosphere Explorer.
R. A. Heelis, J. D. Winningham, W. B. Hanson, and J. L. Burch. 1980, 33p NASA-CR-163429
Contract NAS5-11407, Grant NSG-5085

Simultaneous measurements of the auroral zone particle precipitation and the ion convection velocity by Atmosphere Explorer show a consistent difference between the location of the poleward boundary of the auroral particle precipitation and the ion convection reversal. The difference of about 1.5 degrees of invariant latitude is such that some part of the antisunward convection lies wholly within the auroral particle precipitation region. The nature of the convection reversals within the precipitation region suggests that in this region the convection electric field is generated on closed field lines that connect in the magnetosphere to the low latitude boundary layer.

N80-29950/6 PC **A04/MF A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e. V., Freiburg (Germany, F.R.). Inst. fuer Physikalische Weltraumforschung.
Sounding Rocket Program in Aeronomy: Electron Density Experiment Based on the Dispersive Doppler Effect.
Final Report.
L. Unger. Nov 79, 67p BMFT-FB-W-79-19
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The electron content between a transmitter on the ground and a receiver on a rocket was accurately determined. Different approaches to applying this technique were examined. The importance of the noise situation onboard the rocket as a decisive factor in selecting the type of receiver was emphasized. Applying modulation at the ground transmitter and using a rather low first frequency, the device was able to give the slant range to the receiver on board as well as the electron content down to electron densities of about 10 million/cu cm. Measured electron density profiles were measured including one obtained during winter anomaly conditions and one during a proton event. The hardware on board the rocket and on the ground as well as the computer program (ALADDIN) used to process the radio signals are also described in detail.

N80-29951/4 PC **A02/MF A01**
International Meteorological Inst., Stockholm (Sweden).
Research Activities in Meteorology in Sweden from July 1978 to June 1979.
Annual Report.
Nov 79, 31p AR-78-79

Research continuing or completed in 1979 is reported in dynamic meteorology, climatology, and geophysical fluid mechanics as well as atmospheric chemistry and atmospheric physics. Noteworthy results in the modeling of moisture, condensation, cloud formation and dissipation are discussed. Information on the chemical composition of the atmosphere is given. Aeronomy research results are also described.

PB80-852866 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Van Allen Belt. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Aug 80, 91p
NERACUSGNT0238
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the properties, and dynamics of the Van Allen Belt. Discussions cover such topics as induced precipitation of inner zone electrons and pitch-angle diffusion of radiation electrons. (Contains 088 citations.)

PB80-852882 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Whistlers and Dawn Chorus. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Aug 80, 175p
NERACUSGNT0237
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory, and application of Whistler waves to such topics as Whistler waves in finite plasma, Whistler atmospherics, and Whistler mode in the magnetosphere. (Contains 174 citations.)

PB80-852890 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Whistlers and Dawn Chorus. December, 1974-May, 1980 (Citations from the Energy Data Base).
Rept. for Dec 74-May 80,
Howard L. Ogushwitz. Aug 80, 199p
NERACEDBNT0237
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory, and application of Whistler waves to such topics as Whistler waves in finite plasma, Whistler atmospherics, and Whistler mode in the magnetosphere. (Contains 200 citations.)

PB80-854615 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Planetary Waves. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jun 80, 175p
NERACIAANT0604
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the properties of planetary waves and other long waves. The long waves include very low frequency electromagnetic phenomena. (Contains 095 citations.)

PB80-854623 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Planetary Waves. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 168p
NERACUSGNT0604
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the properties of planetary waves and other long waves. The long waves include very low frequency electromagnetic phenomena. (Contains 125 citations.)

PB80-854631 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Planetary Waves. July, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jul 76-May 80,
Howard L. Ogushwitz. Jun 80, 98p
NERACEDBNT0604
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the properties of planetary waves and other long waves. The long waves include very low frequency electromagnetic phenomena. (Contains 061 citations.)

PB80-857634 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Anomalies. November, 1973-June, 1980 (Citations from the NTIS Data Base).
Rept. for Nov 73-Jun 80,
John H. Frey. Jun 80, 216p NERACUSGNT0796
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the location and effects and on the measurement and analysis of geomagnetic anomalies are contained in this retrospective bibliography. (Contains 195 citations.)

PB80-857642 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Anomalies. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
John H. Frey. Jun 80, 69p NERACIAANT0796
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on satellite measurements of geomagnetic and lunar magnetic field anomalies and their effects on charged particles are contained in this retrospective bibliography. (Contains 141 citations.)

UCRL-50042-79 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Annual Report of Lawrence Livermore Laboratory to the FAA on the High Altitude Pollution Program, 1979.
F. M. Luther. 30 Sep 79, 75p
Contract W-7405-ENG-48

Progress in two major research areas is reported. They are numerical modeling of the atmospheric response to stratospheric perturbations, and the processing, archiving, and analysis of satellite ozone data. Each of these research areas has been divided into a number of subtasks. Those reported under atmospheric modeling are: model simulations of stratospheric observations; potential changes in ozone resulting from other perturbations; effects of speculative reactions and mechanisms; and stratospheric water vapor. Subtasks of the research on satellite ozone data processing, archiving, and analysis include: radiative transfer and retrieval methodology; data basing and data processing; and data analysis. One of two appendixes includes a description of a one-dimensional transport-kinetics model. (ERA citation 05:029578)

4B. Meteorology

AD-A088 050/0 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Numerical Simulation of the Influence of Sea-Surface Temperature on Translating Tropical Cyclones.
Memorandum rept.,
Simon W. Chang, and Rangarao V. Madala. 17 Jul 80, 46p Rept no. NRL-MR-4272

A three-dimensional numerical model with a domain of 3000 x 3000 km is used to study the influence of sea-surface temperature (SST) on the behavior of tropical cyclones translating with mean flows in the Northern Hemisphere. We find that tropical cyclones tend to move into regions of warmer SST when a gradient of SST is perpendicular to the mean ambient flow vector (MAFV). The model results also indicated that a region of warmer SST situated to the right side of the MAFV is more favorable for storm intensification than to the left side due to the asymmetries in air-sea energy exchanges associated with translating tropical cyclones. The model tropical cyclone intensifies and has greater rightward deflection in its path relative to the MAFV when translating into the region of warmer SST. The model tropical cyclone intensifies when its center travels along a warm strip, it weakens along, but does not move away from a cool strip. The results suggest that the SST distribution not only affects the intensity and path of tropical cyclones frictionally, but also affects them thermally through processes of heating redistribution and geostrophic adjustment. (Author)

AD-A088 059/1 MF **A01**
Maryland Univ College Park Dept of Meteorology
The Microclimate of a Tropical Evergreen Forest.
Final rept. 15 Jul 76-31 Dec 79,
R. T. Pinker, and O. E. Thompson. Aug 80, 100p
ARO-13660.4-GS
Grant DAAG29-76-G-0292
Availability: Microfiche copies only.

Selected results of a three year project to study the climatological and micrometeorological conditions in a tropical evergreen forest, are summarized in this report. The forest area under study is in the interior of Thailand and is influenced by a cool, dry northeast monsoonal flow in the winter and a warm, moist southwest monsoonal flow in the summer. Information collected during a three year field program included ground stations temperature, relative humidity, precipitation, evaporation, hours of sunshine and tower measurements of temperature, dew point temperature, wind velocity, incoming and reflected solar radiation, incoming and outgoing infrared radiation, spectral radiation and sub-surface temperature profiles in the forest and in a cleared area within the forest. (Author)

AD-A088 156/5 PC **A04**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Atlas of Cloud-Free Line-of-Sight Probabilities. Part 5. North Africa and the Middle East.
Air Force surveys in geophysics,
Iver A. Lund, Donald D. Grantham, Eugene A. Bertoni, and Clarence B. Elam, Jr. 9 Nov 79, 67p
Rept nos. AFGL-TR-79-0275, AFGL-AFSG-417
See also Part 2, AD-A040 705.

This is the fifth part of a planned Northern Hemisphere atlas of probabilities of cloud-free lines-of-sight between the earth and space. The probabilities are for the mid-season months: January, April, July, and October; four times of day: 0000-0200 LST, 0600-0800 LST, 1200-1400 LST, and 1800-2000 LST; and three elevation angles: 10, 30 and 90 deg. Parts 1, 2, 3, and 4 depicted cloud-free line-of-sight probabilities for Germany, the USSR, the USA, and Europe, respectively.

AD-A088 229/0 PC **A06**/MF **A01**
Naval Research Lab Washington DC
Passive 19.3 GHz Radiometer and Aerosol Data from the North Sea during MARSEN I, September-October 1979.
Memorandum rept.,
S. G. Gathman, and B. G. Julian. 13 Aug 80, 104p Rept no. NRL-MR-4285

Aerosol concentrations in five size ranges with a minimum detection size of d=0.5 microns and the horizontal and vertical polarities of passive 19.3 GHz microwave radiation at various angles to nadir were obtained in the North Sea during MARSEN I in the September-October 1979 time frame. These data together with pertinent simultaneous meteorological measurements are reported on an hourly basis. (Author)

AD-A088 282/9 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Techniques for Examining Drop Size Spectra in Water Sprays and Clouds.
F. W. Skidmore, and R. E. Pavia. Apr 79, 39p
Rept no. ARL/MECH-ENG NOTE-375

Qualitative comparisons have been made of water drop sampling methods for sprays and clouds, employing slides coated with oil, gelatin and soot. Oil-wetted and soot coated slides have been compared quantitatively when exposed in nominally identical water sprays simulating natural clouds. When compared with gelatin and oil-wetted slides, soot slides are more convenient to prepare, expose and analyse, and records are permanent. Within the inherent limitations of all spray sampling methods, drop size distributions and mean drop sizes given by the oil and soot methods are in substantial agreement, provided that known sources of error of the oil-wetted method are allowed for. Soot slides appear to be capable of detecting ice particles in clouds; quantitative calibrations relating ice impingement impressions to crystal size are required. (Author)

AD-A088 346/2 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
12824C LANCE, Missile Number 5194, Round Number 353 NPL, 4 July 1980.
Meteorological data rept.

Jul 80, 31p Rept no. ERADCOM/ASL-DR-1154
Availability: Microfiche copies only.

Meteorological data gathered for the launching of the 12824C LANCE, Missile Number 5194, Round Number 353 NPL, presented in tabular form. (Author)

AD-A088 347/0 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
12823A LANCE, Missile Number 4240, Round Number 354 ECL, 10 July 1980.
Meteorological data rept.
Jul 80, 25p Rept no. ERADCOM/ASL-DR-1155
Availability: Microfiche copies only.

Meteorological data gathered for the launching of 12823A LANCE, Missile Number 4240, Round Number 354 ECL, presented in tabular form.

AD-A088 534/3 PC **A02**/MF **A01**
Florida State Univ Tallahassee Dept of Oceanography
A Prograde Jet Driven by Rossby Waves,
Rory O. R. Y. Thompson. 4 Dec 79, 13p Rept no. 170
Contract N00014-75-C-0201
Pub. in Jnl. of the Atmospheric Sciences, v37 n6 p1216-1226 Jun 80.

No abstract available.

DOE/EV/10097-1 PC **A03**/MF **A01**
Brown Univ., Providence, RI.
Global Temperature Patterns 6000 Years Ago. Progress Report.
T. Webb, III. 1980, 41p
Contract AC02-79EV10097

The overall goal is to illustrate the climatic patterns of 5000 to 7000 years ago over as wide an area of the northern hemisphere as possible. Mapping of the patterns in selected climatic variables at 5000 to 7000 years ago that can be reconstructed from pollen and marine-plankton data is planned. Multivariate statistical methods permit using the modern distribution of these data in order to transform their fossil remains into climate estimates of past times. Given these goals and methods, research during the first eight months focused on assembling the available modern and fossil data from each of the main areas under study. Two workshop conferences were held to help organize the joint work. (ERA citation 05:031111)

N80-29962/1 PC **A02**/MF **A01**
Indian Meteorological Dept., New Delhi.
The Monsoon Experiment Monex.
P. K. Das. Sep 79, 12p ISRO-SN-08-79

A subprogram of the Global Atmospheric Research Program, the monsoon experiment popularly known as MONEX was designed to study the contribution of the monsoons in different parts of the world to the Earth's atmosphere. Data were collected by ships and/or aircraft from India, the U.S.S.R., the United States, and France as well as by GOES and METEOSAT satellites and balloonborne sondes. Of particular interest was the radiation balance of the Earth-atmosphere system. The results which are expected to become available when all the data are analyzed and studied are outlined as well as the implications for India.

N80-29963/9 PC **A03**/MF **A01**
New York Univ., NY.
Mountain Winds (Revisited).
E. Isaacson, and G. Zwas. 1980, 30p NASA-CR-163406
Grant NSG-5034

The prediction of extremely high wind speeds, at ground level on the downstream side of a mountain range, is possible by solving the initial value problem for a two-layered nonlinear shallow water model of the atmosphere. Three different numerical methods are described to find the solutions which may involve shocks: (1) the vonNeumann-Richtmyer artificial viscosity method, (2) a filtering scheme, and (3) a hybrid method.

N80-29964/7 PC **A03**/MF **A01**
Texas A and M Univ., College Station. Dept. of Meteorology.
A Preliminary Assessment of the Accuracy of Selected Meteorological Parameters Determined from Nimbus 6 Satellite Profile Data.
Final Report.
J. R. Scoggins, and G. Petti. Aug 80, 43p NASA-CR-3306
Contract NAS8-31773

Published rms errors in rawinsonde data and discrepancies between satellite and rawinsonde profile data for temperature, dewpoint temperature, mixing ratio, and wind speed. Satellite rms errors were found to be 2 to 3 times as large as those for rawinsonde data. Gradients of the preceding parameters were computed for both rawinsonde and satellite data and compared with means and near extreme values computed from the AVE 2 and AVE 4 experiments. In all cases, it was found that satellite data can be used to determine with relatively good accuracy the near extreme gradients but not those whose value does not exceed the average. Synoptic charts were prepared to show that patterns of temperature could be determined with relatively good accuracy, while those of dew point were not as good as those for temperature. Winds represented by cloud motion vectors (satellite winds) were compared with rawinsonde winds, and it was found that large gaps exist in satellite values for a given pressure level and that errors in the satellite determined concluded that satellite profile data are very useful in synoptic analysis, particularly in data sparse regions as well as regions where near extreme gradients exist in the measured parameters.

N80-29965/4 PC **A03**/MF **A01**
University of Central Florida, Orlando. Dept. of Mathematics and Statistics.
Cloud Cover Models Derived from Satellite Radiation Measurements.
Final Report.
S. J. Bean, and P. N. Somerville. 14 Nov 79, 38p NASA-CR-161490
Contract NAS8-33071

Using daily measurement of day and night infrared and incoming and absorbed solar radiation obtained from a TIROS satellite over a period of approximately 45 months, and integrated over 2.5 degree latitude-longitude grids, the proportion of cloud cover over each grid each day was derived for the entire period. For each of four three-month periods, estimates a and b of the two parameters of the best-fit beta distribution were obtained for each grid location. The (a,b) plane was divided into a number of regions. All the geographical locations whose (a,b) estimates were in the same region in the (a,b) plane were said to have the same cloud cover type for that season. For each season, the world was thus divided into separate cloud cover types. Using estimates of mean cloud cover for each season, the world was again divided into separate cloud cover types. The process was repeated for standard deviations. Thus for each season, three separate cloud cover models were obtained using the criteria of shape of frequency distribution, mean cloud cover, and variability of cloud cover. The cloud cover statistics were derived from once-a-day, near-local-noon satellite radiation measurements.

N80-29972/0 PC **A05**/MF **A01**
Freie Univ., Berlin (Germany, F.R.). Inst. fuer Meteorologie.
Sounding Rocket Program in Aeronomy: Meteorological Evaluation of the Winter Anomaly; Campaign in Spain During 1975/76.
Final Report.
B. Naujokat, K. Petzoldt, J. Knittel, K. Labitzke, and E. Klinker. Oct 79, 84p BMFT-FB-W-79-13
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

It is assumed that one of the causes of the winter anomaly in ionospheric absorption is found in the conditions associated with transport and temperature. Therefore, the circulation in the stratosphere and mesosphere at a height of from 20 to 80 km was examined during the Western European winter anomaly campaign of 1975/76. Results show that the development of planetary waves in space and time, the related horizontal and vertical motions, and their effect on the temperature of the mesopause region have to be considered in order to understand the absorption behavior at a particular location.

N80-29973/8 PC **A03**/MF **A01**
Royal Netherlands Meteorological Inst., De Bilt. Meteorologisch Onderzoek.
Description of Some Properties of the Humidity Analysis Scheme in Use at the European Centre for Medium Range Weather Forecasts.
J. Vanmaanen. 1979, 33p KNMI-V-334
Sponsored by European Centre for Medium Range Weather Forecasts.

The objective humidity analysis used in a medium range numerical weather forecasting computer program was investigated. The accuracy of this scheme and its validity for a numerical forecast was evaluated in two independent ways. First, the weighting function used in the correction method was modified and the results analyzed. Second, the influence of varying the initial moisture field parameter on the forecast was studied. Results indicate that the absolute quality of variations of the weighting function cannot be estimated because of fundamental uncertainty in the true atmospheric state. Regarding specification of initial humidity, it is confirmed essential to numerical forecasting, especially in connection with predictions of rainfall intensity and cloudiness.

PB80-225832 PC **A05**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
Environmental Satellite Imagery, January 1980.
Apr 80, 100p KMRD-5.4-8001, NOAA-80060801
Key to Meteorological Records Documentation. See also report for Dec 79, PB80-220510.

The Key to Meteorological Records Documentation (KMRD) No. 5.4 series is issued monthly to describe current cloud data obtained by NOAA's operational environmental satellites. It contains daily global satellite imagery in condensed from as a guide to data stored in the NOAA archive, and is designed to help users select data for research and climatological use.

PB80-225840 PC **A04**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
Environmental Satellite Imagery, February 1980.
Jul 80, 66p KMRD-5.4-8002, NOAA-80080802
See also report for Dec 79, PB80-220510. Key to Meteorological Records Documentation.

The Key to Meteorological Records Documentation (KMRD) No. 5.4 series is issued monthly to describe current cloud data obtained by NOAA's operational environmental satellites. It contains daily satellite imagery in condensed form as a guide to data stored in the NOAA archive, and is designed to help users select data for research and climatological use.

PB80-225857 PC **A04**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
Environmental Satellite Imagery, March 1980.
Jul 80, 70p KMRD-5.4-8003, NOAA-80080803
Key to Meteorological Records Documentation.

The Key to Meteorological Records Documentatin (KMRD) No. 5.4 series is issued monthly to describe current cloud data obtained by NOAA's operational environmental satellites. It contains daily global satellite imagery in condensed form as a guide to data stored in the NOAA archive, and is designed to help users select data for research and climatological use.

PB80-852296 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Acid Precipitation. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 227p NERACEDBNT0826
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the causes, effects, sources, and controls of acid precipitation and acidification

are contained in this retrospective bibliography. (Contains 138 citations.)

PB80-853799 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Air-sea Interaction Instrumentation . June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 139p NERACUSGNT0701
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the observation and measurement of air-sea (air-water) interactions and instruments and systems for this purpose are contained in this retrospective bibliography. (Contains 091 citations.)

PB80-853807 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Air-sea Interaction Instrumentation . January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
John H. Frey. Jun 80, 87p NERACIAANT0701
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the observation and measurement of air-sea (air-water) interactions and instruments and systems for this purpose are contained in this retrospective bibliography. (Contains 053 citations.)

PB80-855745 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Jet Stream. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 162p NERACIAANT0712
Sponsored in part by National Technical Information Service, Springfield, VA.

Studies of jet stream are cited in relation to storms, atmospheric gravity waves, air pollutants, ozone layers, meteorology, air-convection and others. The use of jet stream by aircraft is also included. (Contains 165 citations.)

PB80-857717 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Acid Precipitation. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 55p NERACEI NT0826
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the causes, effects, sources, and controls of acid precipitation and acidification are contained in this retrospective bibliography. (Contains 030 citations.)

PB80-859879 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Acid Precipitation. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 142p NERACUSGNT0826
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the causes, effects, sources, and controls of acid precipitation and acidification are contained in this retrospective bibliography. (Contains 046 citations.)

PB80-859887 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Acid Precipitation. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
John H. Frey. Jun 80, 61p NERACIAANT0826
Supersedes PB80-810773. Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the causes, effects, sources, and controls of acid precipitation and acidification are contained in this retrospective bibliography. (Contains 036 citations.)

UCRL-84534 PC A02/MF A01
Lawrence Livermore National Lab., CA.
Two-Dimensional Slope Wind Simulations in the Finite Element Approximation.
D. R. Tuerpe. Jun 80, 17p CONF-800480-4
Contract W-7405-ENG-48
ASCOT program planning meeting, Gettysburg, PA, USA, 15 Apr 1980.

The hydrostatic fluid dynamics model developed at LLL has been used to simulate the development of katabatic winds. This model solves the Navier-Stokes equations in the Boussinesq approximation by the finite element method. Preliminary results indicate that to obtain physically reasonable results one has to choose unequal diffusion parameters in the horizontal (K/sub x/) and vertical (K/sub z/). The maximum velocities obtained with K/sub z/ = 1 m exp 2 /sec and K/sub x/ = 100 m exp 2 /sec are of the order of 2.5 m/sec for a slope of .2. Profiles of the downslope velocities will be presented at different points in the flow. As expected, the magnitude of the vertical diffusion coefficient K/sub z/ controls the depth of the flow which seems to increase only slightly with downhill distance, and the magnitude of the flow increases with cooling rate and slope. (ERA citation 05:031114)

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A087 949/4 MF A01
Army Military Personnel Center Alexandria VA
Construction Management Activities of Governmental Agencies in the New England Area During the Construction Phase.
Final rept.,
Richard Francis Sliwoski. Feb 80, 273p
Master's thesis.
Availability: Microfiche copies only.

This thesis examines the construction management activities performed by resident engineers or the similarly responsible individuals of three governmental agencies; the U.S. Army Corps of Engineers, the Naval facilities Engineering Command, and the U.S Postal Service, during the construction phase. Information was gathered by first researching applicable laws and statutes, obtaining agency regulations and guidelines, and reviewing the agencies training material. Personal interviews were then conducted to compare theory with practice. (Author)

AD-A088 074/0 PC A20/MF A01
Stanford Univ CA Center for Materials Research
Materials Research at Stanford University, 1 July 1979 - 30 June 1980.
Annual rept. no. 19, 1 Jul 79-30 Jun 80.
Jul 80, 460p Rept no. CMR-80-7
Grant NSF-DMR77-24222

This Nineteenth Annual Report includes the total research activity related to the science of materials at Stanford University during the period July 1, 1979 through June 30, 1980. It contains brief descriptions of research programs active during this period.

AD-A088 147/4 PC A03/MF A01
Maryland Univ College Park Coll of Business and Management
The Ideas of Frederick W. Taylor: An Evaluation.
Technical rept.,
Edwin A. Locke. Aug 80, 46p Rept no. GS-3
Contract N00014-79-C-0680

The ideas and techniques of Frederick W. Taylor, the founder of Scientific Management, were examined with respect to their validity and their degree of acceptance in modern management. With respect to the principle of scientific decision-making and techniques such as: time and motion study, standardization, goal setting with feedback, money as a motivator, management responsibility for training, scientific selection, the shortened work week and rest pauses, Taylor's views were fundamentally correct and have been generally accepted. With respect to individualized work and the principle of labor-management cooperation, his views were probably only partially correct and have been only partially accepted. Criticisms of Taylor with respect to his alleged: inadequate view of motivation, ignorance of social factors, authoritarianism, treatment of men as machines, exploitation of workers, anti-unionism, and personal dishonesty are predominantly or wholly false. The accusation concerning over-specialization is only partially justified. Generally Taylor's contributions and his genius have not been understood or appreciated by contemporary writers. (Author)

AD-A088 289/4 PC A14/MF A01
Rome Air Development Center Griffiss AFB NY
Industry Looks at RADC - 1980. Volume I.
1980, 310p Rept no. RADC-TR-80-195-VOL-1
See also Volume 2, AD-A088 291.

This report is a compilation of presentation materials used during the 2-day 'Industry Looks at RADC' briefings given on 3 - 4 June 1980. Projected RADC areas of contractual opportunity for FY 81 - 82 are given. (Author)

AD-A088 291/0 PC A11/MF A01
Rome Air Development Center Griffiss AFB NY
Industry Looks at RADC - 1980. Volume II.
1980, 239p Rept no. RADC-TR-80-195-VOL-2
See also Volume 3, AD-A088 341.

For abstract see AD-A088 289.

AD-A088 314/0 PC A02/MF A01
Air Force Human Resources Lab Brooks AFB TX
Technology Projection: Manpower and Logistic Factors in Weapon System Development.
Final rept.,
Gordon A. Eckstrand. Aug 80, 20p Rept no. AFHRL-TR-80-2

This report outlines the importance of and requirement for considering manpower and logistic factors in weapon system acquisition programs. The scope of the area is defined, and the relationships between the Integrated Logistics System program and the Human Factors Engineering program are discussed. Developing weapon systems which can meet peacetime readiness and wartime employment objectives at the lowest possible life cycle cost (LCC) requires the ability to integrate manpower and related support considerations into the system acquisition process in a way that allows them to influence requirements and design. A number of human factors related technologies that contribute to the achievement of this goal are described. The areas covered are: Maintenance Manpower Modeling; Training Plans and Requirements; Maintenance Technical Data; System Ownership Costing; Human Resources in Design Trade-offs; Supporting Data Bases. For each of these component technologies, a near-term (5 years) technology projection is presented. Although each of the component technologies independently can make an important contribution to weapon system acquisition, what is needed most is a method to integrate the application of these component technologies during weapon system development or modification. Work to provide such an integrated methodology is described and a near-term technology projection in this area is provided. In addition, far-term (10 to 15 years) projections are provided for each of the component technologies and for the integrated application of these technologies.

AD-A088 326/4 PC **A05**/MF **A01**
Center for Naval Analyses Alexandria VA
Annual Report, 1979.
1979, 78p
Contract N00014-76-C-0001

No abstract available.

AD-A088 341/3 PC **A11**/MF **A01**
Rome Air Development Center Griffiss AFB NY
Industry Looks at RADC - 1980. Volume III.
1980, 249p Rept no. RADC-TR-80-195-VOL-3
See also Volume 1, AD-A088 289.

For abstract see AD-A088 289.

AD-A088 379/3 PC **A07**/MF **A01**
Florida Univ Gainesville Dept of Industrial and Systems Engineering
Evolutionary Development of an Interactive Scheduling System for a Generalized Flowshop.
Research rept.,
Gerald Wayne McDonald. Aug 80, 144p Rept no. RR-80-13
Contract N00014-76-C-0096

The application of interactive computer techniques to the scheduling of industrial production operations has long seemed to e a potential way to break through the many problems that are encountered in this area, however, most attempts to apply such techniques have ended in failure. The author reports on a successful application created for an aircraft overhaul facility operated by the U.S. Navy. The major emphases are in the evolutionary method utilized for the development of the system and in the efforts applied during development to overcome the causes of failure in earlier interactive scheduling efforts. The project involved the development of a Management Information System (MIS) to underly the later developments associated with the creation of production schedules. Subsequent to the completion of the prototype for the MIS, the next phase was the creation of a set of computer programs designed to create production schedules for future periods. The objective function applied during the creation of schedules involved the reduction of standard deviations for the daily requirements for critical manpower resources through the judicial selection of starting dates for the different aircraft being inducted for overhaul.

AD-A088 521/0 PC **A04**/MF **A01**
Logistics Studies Office (ALMC) Fort Lee VA
Army and Customer Total Production Requirements and Distribution Priorities for Major Items.
Final rept.,
Hunter W. Tyler. Jun 80, 52p

This report is concerned with the submission of requirements and distribution of Army-managed major items (less ammunition) only. It examines DODI 7045.7 (The Planning, Programming, and Budgeting System) which pertains to the determination and submission of budget requests of the military services. It analyzes the content of Chapter 2, Joint Regulation (AFLCR 400-21/DARCOM-R 700-99/NAVMATINIST 4790.23A/MCO P4410.22A) - Elimination of Duplication in the Management and Logistics Support of Multiused Nonconsumable Items, which prescribes the procedures used by the military services in the supply and depot maintenance operations of Nonconsumable Item Material Support Codes (NIMSC) 1, 2, 3, 4, or 9 which include major items. The need for a standardized Army plan for the distribution of Army-managed major items to the Army and other customers is also discussed. A conceptual method to achieve visibility of the total requirements/production quantity of Army-managed major items and the means to establish an Army standardized distribution plan for these major items throughout the Army and to the other military services is also presented. (Author)

BMFT-FB-T-79-186 PC **A11**/MF **A01**
VDI-Technologiezentrum, Berlin (Germany, F.R.).
Documentation of and Information on Protective Rights to Government Support on Technological Research and Development. Final Report.
I. Gretscher. Dec 79, 242p
In German.
U.S. Sales Only.

The German Ministry of Research and Technology (BMFT) supports research and development projects relating to industrial and institutional areas. The supported programs relating to Technological Research and Development include the categories electronics, metallurgical process techniques and material technology, nonnuclear energy techniques, physical technologies, and technical communication. The present compilation contains those protective rights that resulted from government-supported programs within these categories. It contains mainly applications filed in 1976 and 1977. The protective rights are described together with complete data, characterizing keywords, and brief descriptive abstracts in order to allow documentation and information. The contents of these protective rights can be obtained by use of the classification according to the given categories, the classification according to the international Patent Classification, and an index. (ERA citation 05:029177)

DOE/CR-0015 PC **A06**/MF **A01**
Department of Energy, Washington, DC. Office of the Controller.
Cost and Schedule Control Systems Criteria for Contract Performance Measurement. Implementation Guide.
May 80, 109p

This document provides uniform guidance for implementation of the DOE Order 2250.1, Cost and Schedule Control Systems Criteria (CSCSC) for Contract Performance Measurement. Its purpose is to assist both DOE and contractor representatives in fulfilling their responsibilities for meeting CSCSC requirements. Compliance with the contractual requirements for work definition, cost and schedule control, and performance reporting should provide increased assurance that a contractor's progress is sufficiently visible to indicate status reliably and to provide the basis for timely and meaningful management decisions. 8 figures. (ERA citation 05:031425)

EPRI-EA-1462 PC **A03**/MF **A01**
Decision Focus, Inc., Palo Alto, CA.
Integrated Models for R and D Planning. Interim Report.
S. M. Barrager, S. M. Haas, D. B. Oman, and R. A. Marshalla. Jul 80, 36p

This project phase has sponsored the development and testing of an energy modeling system made up of generic model logic components and standardized computer software offering flexibility and user-access. Elegant model logic extensions in the areas of rate design, cost-of-service pricing, and end-use load shape representations have also been implemented. The current report reviews the theory underlying energy modeling systems of this type, and describes the model logic enhancements in some detail. (ERA citation 05:030775)

EPRI-PS-1141-SR PC **A10**/MF **A01**
Electric Power Research Inst., Palo Alto, CA.
Overview and Strategy: 1980-1984 Research and Development Program Plan.
Jul 79, 208p

This document - addressed to the planners, executives and other decision makers of EPRI's supporting utilities and to those with managerial responsibilities in EPRI - describes the basic thrust and rationale of the Institute's R and D activities for the period 1980 to 1984. Although this plan is reformulated each year and is gradually modified in response both to changing conditions and to the findings and developments of EPRI's ongoing R and D programs, this document is unique in a number of respects, most notably in its articulation of the general strategy that underlies all of EPRI's research and development work. It is meant to provide a set of dependable, usable guidelines for those within EPRI who must direct and manage many concurrent programs and for those in the utilities who must make decisions about their own future course. (ERA citation 05:029200)

HMI-263 PC **A06**/MF **A01**
Hahn-Meitner-Inst. fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.). Bereich Kernchemie und Reaktor.
Report of Scientific Results 1977.
1977, 114p
In German and English.
U.S. Sales Only.

The scientific progress report of the HMI for 1977 gives a survey of the main results of HMI research in the fields of neutron scattering, radiation damage in solids, reactor chemistry, trace element research in biomedicine, geochemistry, reactor operation, and radionuclide production. After this, short summaries are given of HMI publications and papers in the above fields. (Atomindex citation 10:427591)

HRP-0028402/6 PC **A03**/MF **A01**
Massachusetts Office of State Health Planning, Boston.
Planning Rate Setting and Capital Expenditures Controls: The Massachusetts Experience,
Clayton Medeiros. Oct 78, 39p
Paper presented at the American Public Health Association Annual Meeting, October 1978.

Basic approach, specific technical developments, and production of a draft State health plan used in linking planning to rate setting, capital expenditures, and service controls in Massachusetts are outlined. It is argued that all parts of the health system are interrelated, so that planning and regulation must be linked. The State has a traditional planning structure with a 70-member State health coordinating council and six fully designated health system agencies. Per capita expenditures are 30 percent higher and per capita Medicaid spending 70 percent higher than nationwide. For acute care, trends are toward larger hospitals; nursing homes for long-term care represent the State's largest health resource. Planning of acute facilities (e.g. obsolescence, predicted capacity) is facilitated by the certificate-of-need requirement for a five year plan in which goals, equipment, and cost must be stated; to contain costs, reasonable financial requirements have been defined for operating expenses, capital costs, and accounts receivable. In the long-term care area, integrated planning approaches include restrictive bed planning and increased emphasis on home care needs; a major problem for nursing homes solved by long-tern planning is reimbursement of fixed costs and insolvency. The State plan outlines health policy initiatives and tools; it is emphasized that appropriateness review is incorporated into effective state health plans. Twelve tables are furnished.

HRP-0029145/0 PC **A04**/MF **A01**
Young (Arthur) and Co., Washington, DC.
Capital Expenditure Projects: A Basic Handbook on Financial Feasibility.
Nov 75, 74p
Contracts PHS-HSM-110-73-516, PHS-HRA-106-74-27

The handbook differs substantially from earlier efforts which were associated with past legislation. First, this document relates specifically to the Health Systems Agency and its place in the health planning continuum. Second, it describes in detail the application, review, and appeal procedures for capital planning developed under the 1974 legislation. Third, this guide contains a comprehensive work program to familiarize health planners with the sequence of financial feasibility activities. Fourth, it provides an outline of needed documentation for capital expenditure planning. Fifth, it contains an extensive discussion of alternative capital financing sources.

INIS-mf-4072 PC **A99**/MF **A01**
Bochum Univ. (Germany, F.R.).
Research Report 1976. Pt. 2.
1976, 640p
In German.
U.S. Sales Only.

The research report describes the work of the faculties of Bochum university in 1976, the so-called 'overlapping institutes' and the special research sectors 'biological signal reception and processing', ('Bionach'), 'plasma physics Bochum/Juelich', and the institute for development research and policies. (Atomindex citation 09:366237)

INIS-mf-4334 PC **A02**/MF **A01**
Atomic Energy Board, Pelindaba, Pretoria (South Africa).
AEB Highlights.
1977, 7p
In Afrikaans.
U.S. Sales Only.

AEB HIGHLIGHTS is a half yearly report reflecting the most important recent achievements of the various Research and Technical Divisions of the Atomic Energy Board. It appears alternately in English and Afrikaans. (Atomindex citation 09:392633)

PB80-218605 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Highway Safety Research and Development--Better Management Can Make It More Useful.
28 Jul 80, 84p CED-80-87

The Department of Transportation could strengthen its management of highway safety research and development so that research results can be more effective as a resource for State and local highway safety programs. The Department's National Highway Traffic Safety Administration would be more responsive to highway safety research users if it routinely included them in all phases of planning. The Safety Administration's research results would also be more valuable if these results were evaluated and better disseminated.

PB80-218787 PC **A04**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Economic Development Div.
Federal Outlays in Fiscal 1978: A Comparison of Metropolitan and Nonmetropolitan Areas.
Rural development research rept.,
Charles I. Hendler, and J. Norman Reid. Sep 80, 75p RDRR-25
See also report for 1976, PB-285 884.

Residents of U.S. metropolitan areas received an average of $1,845 per capita in nonmetropolitan areas, during fiscal year 1978. Outlays vary considerably between metropolitan and nonmetropolitan counties. Nonmetropolitan areas received $195 more per capita for agriculture, energy, and the environment, for example, while metropolitan areas received almost $300 more per capita for defense programs. This study estimates or traces 86 percent of the $499 billion of Federal outlays and loan guarantees made in 1978 to individual counties.

PB80-225667 PC **A02**
Oregon State Univ.. Corvallis. Sea Grant Coll. Program.
Management Provoked Conflict in Fisheries,
Courtland L. Smith. c1980, 6p ORESU-R-80-003, NOAA-80072912
Grant NOAA-04-8-M01-144
Pub. in Environmental Management, v4 n1 p7-11 1980.

Fishery management concepts incorporate a number of value judgements about what social goals are right for a fishery. These value judgements result in optimizing some goals over others. Since the public, fishermen, and consumers weigh goals differently than managers, frustration and conflict result. The correspondence between social goals specified by the public and those inherent in management concepts need to be evaluated. (Copyright (c) 1980, Springer-Verlag New York Inc.)

PB80-226327 PC **A08**/MF **A01**
Charles River Associates, Inc., Boston, MA.
Innovation, Competition, and Government Policy: A Framework for Analysis.
Final rept.
Sep 80, 168p CRA-430, NBS-GCR-ETIP-80-92
Contract NBS-78-3600

The study has the following objectives: (1) to develop a methodology that policy makers can use to gain an increased understanding of the relationships between federal policies and the behavior and performance of firms in technology-based industries; (2) to test and refine this methodology; (3) to identify important policy problems; and (4) to design policy experiments.

PB80-227259 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Modelling the Flow of Work in Architects' Offices.
Current papers,
R. W. Goodsman. c1979, 16p CP-4/79

The paper describes the computer model OFFSIM (OFFice SIMulation) which is used to investigate the flow of projects through architects' offices. It also gives the results of testing the model at two large public offices and some experiments with alternative management strategies at one of them. The model shows considerable potential for further development and application.

PB80-227846 PC **A03**/MF **A01**
Community Development Credit Union Inst., Washington, DC.
Management and Technical Assistance for Community Development Credit Unions.
Final rept.
Sep 80, 43p EDA-80-0135

The Community Development Credit Union Institute (CDCUI) of the National Center for Urban Ethnic Affairs provided technical assistance and management training to seven community development credit unions during the past year. After careful analysis of each credit union, individualized training and assistance programs were implemented. The overriding objectives were to strengthen the CDU's internal structure and fiscal soundness.

PB80-228471 PC **A04**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
Improving Farmers Home Administration Guaranteed Loan Secondary Market Operations.
L. A. Isenberg. May 80, 75p AU/IAPFM-85-79-6
Sponsored in part by Farmers Home Administration, Washington, DC.

The report includes information and data pertaining to the secondary market operations for the Farmers Home Administration guaranteed loans. The main data collection method used was a questionnaire to security dealers who had indicated an interest in the secondary market. Data included in the report includes: (1) How dealers learned about the program (2) Source of guaranteed loans (originator) (3) Type of investors who purchased the loans and (4) Dealer comments on the secondary market for FmHA programs. Recommendations for improvement of the program are also included in the report.

PB80-852569 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Zero-Base Budgeting. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 49p NERACUSGNT0854
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the latest innovations in the application of zero-base budgeting to industry, small businesses, large cities, and the Air Force. (Contains 037 citations.)

PB80-853567 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Program Evaluation Review Technique (PERT). June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 35p NERACEI NT0823
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe PERT (program evaluation and review technique), a network planning technique used to plan, schedule, and control projects. Also included are a few articles on other program evaluation techniques, such as MIS (management information and control system), value engineering, and configuration management. (Contains 048 citations.)

PB80-856123 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Risk Analysis and Management. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 57p NERACIAANT0875
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the methods and techniques used for risk analysis, assessment, and management in business, the environment, transportation, and other potential hazards to man. (Contains 049 citations.)

PB80-856131 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Risk Analysis and Management. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 194p NERACEI NT0875
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the methods and techniques used for risk analysis, assessment, and management in business, the environment, transportation, and other potential hazards to man. (Contains 206 citations.)

PB80-856255 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Inventory Control. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 126p NERACEI NT1028
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the applications of systems analysis and operations research to inventory management and control in industry, government, the military, and institutions are contained in this retrospective bibliography. (Contains 146 citations.)

PB80-856263 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Project Planning and Control. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 183p NERACUSGNT1031
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the application of operations research and systems analysis to the planning and control of miscellaneous projects ranging from space to industry to farming are contained in this retrospective bibliography. (Contains 165 citations.)

PB80-856289 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Reliability and Quality Assurance. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 162p NERACEDBNT1032
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the applications of operations research and systems analysis to reliability and quality assurance in general and in specific industries (especially with regard to safety, risk analysis, and operational continuity) are contained in this retrospective bibliography. (Contains 148 citations.)

PB80-856297 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Reliability and Quality Assurance. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 54p NERACEI NT1032
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the applications of operations research and systems analysis to reliability and quality assurance in general and in specific industries (especially with regard to safety, risk analysis, and operational continuity) are contained in this retrospective bibliography. (Contains 050 citations.)

PB80-856305 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Reliability and Quality Assurance. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
John H. Frey. Jun 80, 127p NERACIAANT1032
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the applications of operations research and systems analysis to reliability and quality assurance in general and in specific industries (especially with regard to safety, risk analysis, and operational continuity) are contained in this retrospective bibliography. (Contains 133 citations.)

PB80-856354 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to State Government. May, 1972-June, 1980 (Citations from the NTIS Data Base).
Rept. for May 72-Jun 80,
John H. Frey. Jun 80, 94p NERACUSGNT1247
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the applications of operations research and systems analysis to the various functions of state government are contained in this retrospective bibliography. (Contains 075 citations.)

PB80-858038 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cost Control Methods. December, 1976-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Dec 76-Jun 80,
William V. Sassi. Aug 80, 188p NERACEI NT0355
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of cost control methods in industry, business, and government. The articles describe the decision making process, and cost cutting technology for optimum cost reduction. (Contains 200 citations.)

PB80-858046 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cost Control Methods. September, 1977-May, 1980 (Citations from the Energy Data Base).
Rept. for Sep 77-May 80,
William V. Sassi. Aug 80, 218p
NERACEDBNT0355
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of cost control methods in industry, business, and government. The articles describe the decision making process, and cost cutting technology for optimum cost reduction. (Contains 200 citations.)

PB80-858079 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cost Control Methods. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 81p NERACIAANT0355
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of cost control methods in industry, business, and government. The articles describe the decision making process, and cost cutting technology for optimum cost reduction. (Contains 112 citations.)

PB80-858087 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cost Control Methods. May, 1978-June, 1980 (Citations from the NTIS Data Base).
Rept. for May 78-Jun 80,
William V. Sassi. Jun 80, 251p
NERACUSGNT0355
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of cost control methods in industry, business, and government. The articles describe the decision making process, and cost cutting technology for optimum cost reduction. (Contains 200 citations.)

PB80-859689 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Local Government. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 215p NERACUSGNT1248
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the applications of operation research and systems analysis to the management and operations of local governmental activities ranging from natural resources to municipal hospitals are contained in this retrospective bibliography. (Contains 200 citations.)

PB80-860117 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Inventory Control. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 74p NERACUSGNT1028
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the application of systems analysis and operations research to inventory management and control in industry, government, the military, and institutions are contained in this retrospective bibliography. (Contains 065 citations.)

PB80-860125 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Reliability and Quality Assurance. August, 1971-June, 1980 (Citations from the NTIS Data Base).
Rept. for Aug 71-Jun 80,
John H. Frey. Jun 80, 227p NERACUSGNT1032
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the applications of operations research and systems analysis to reliability and quality assurance in general and in specific industries (especially with regard to safety, risk analysis, and operation continuity) are contained in this retrospective bibliography. (Contains 200 citations.)

PB80-928119 PC **E02**
Central Intelligence Agency, Washington, DC.
Organization of USSR Ministry of Defense; a Reference Aid.
Wall chart.
Sep 80, 10p CR-80-11951
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928100.

The chart reflects the organization of the USSR Ministry of Defense and the Armed Forces and includes the names of the highest ranking officers in the Ministry and the Forces.

5B. Documentation and Information Technology

AD-A088 009/6 Not available NTIS
International Atomic Energy Agency Vienna (Austria) International Nuclear Information System
INIS: Authority List for Corporate Entries and Report Number Prefixes.
Apr 80, 476p Rept no. IAEA-INIS-6(REV-13)
Supersedes report dated Apr 79, AD-A077 598 and all previous revisions and their supplements. Availability: International Atomic Energy Agency, INIS Section, P.O. Box 100, Vienna International Center, A-1400, Vienna, Austria (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 319/9 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
complexity of Storage and Retrieval Problems.
Final rept. 14 Jan 77-30 May 80,
Peter Elias. 18 Jul 80, 6p ARO-14649.2-EL
Contract DAAG29-77-C-0012

This project has investigated the costs imposed by the need for communication between user and machine and between components of the machine in solving data-processing problems. There have been three principal substasks. The first, exploration of the minimal costs of storing and accessing information in simple data structures, is the oldest and results have been reported in several publications. The second is the design of minimax optimal universal codeword sets which can be used to represent any message set efficiently by assigning messages in order of decreasing probability to codewords in order of increasing length. A manuscript giving results of this research is almost ready for publication. The third is the exploration of switching networks which can be used for communication between a number of processors engaged in common computational task: that work is still in an early stage and is not yet ready for publication. (Author)

AD-A088 516/0 PC **A04**/MF **A01**
Computer Systems Management Inc Arlington VA
The Design and Development (D2) of Generic Microcomputer-Based Command and Control (C2) Decision and Forecasting Systems.
Quarterly technical rept. 1 Apr-30 Jun 80,
James F. Wittmeyer, III. 30 Jun 80, 68p Rept no. CSM-TR-80-04
Contract MDA903-80-C-0155, ARPA Order-3829

The conduct of research into the nature and use of advanced command and control (C2) computer-based decision and forecasting systems requires effort in the C2 computer-based systems design, development, demonstration, transfer, and documentation areas. This report examines the design and development (D2) of generic microcomputer-based systems via the identification and evaluation of DBMSs and statistical analytical systems/routines. (Author)

AD-A950 016/6 PC **A21**/MF **A01**
Defense Documentation Center Alexandria VA
Thesaurus of DDC Descriptors.
Jun 66, 495p
Supersedes DDC Supplement to the Thesaurus of ASTIA Descriptors (Second Edition), DDC Authorized Descriptors (July 1964) and Descriptor Hierarchies (July 1964).

No abstract available.

ED-179 210 Not available NTIS
Illinois State Library, Springfield.
Illinois White House Conference on Library and Information Services,
Jean Baron. Apr 79, 100p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Pub. in Jrnl. of Illinois Libraries; v61 n4 p303-92 Apr 1979.

This issue of 'Illinois Libraries' is a report of the Illinois White House Conference on Library and Information Services, held in Springfield, November 12-14, 1978. After a brief introduction, the planning process for the conference is described, including

committee work, timetables established, the efforts of state agencies, delegate selection procedures, and public relations activities. Activities at the 17 regional conferences held prior to the state conference are summarized, and an analysis of their 315 delegates--by area of occupation and assorted categories of information--is provided. A narrative report of the state conference is given, the 108 recommendations that emerged from consolidating delegate reports are listed, and the delegates chosen to represent Illinois at the White House Conference are identified. After an evaluation of the White House Conference activities in Illinois against the objectives of the advisory/planning committee, the report concludes with a conference summary and challenge. Side notes include various committee member listings, a listing of state conference delegates, a summary description of libraries in Illinois, conference rules, speakers, a description of the Information Game Exhibit at the Conference, and some typical post-conference comments by attending delegates.

ED-179 213 Not available NTIS
Charleston Coll., SC. Robert Scott Small Library.
Introduction to Bibliography and Research Methods Handbook,
Cerise Oberman-Soroka. 1979, 53p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Used as a primary text for a reqired one-hour basic research methods course at the College of Charleston, this handbook is designed to familiarize the student with the basic precepts and tools used in research. Each of the seven chapters represents a different step in the research process: (1) locating background information--encyclopedias; (2) locating books and monographs--card catalog; (3) locating magazine, journal, and newspaper articles--periodicals, periodical indexes, and abstracts, (4) evaluating books, films, and plays--review sources; (5) locating biographical information; (6) tracing government legislation; and (7) citing sources--descriptive bibliography. Call numbers are provided for all reference sources cited, and a flow chart for basic research methodology is included. An appendix presents general information on the College of Charleston libraries, describes the Charleston Consortium, and provides a glossary.

INIS-mf-4636 PC **A05**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.).
Research Reports 'Nuclear Research' (BMFT-KBK) (1965-1975). Research Reports 'Data Processing' (BMFT-FB DV) (1971-1975).
1975, 88p
In German.
U.S. Sales Only.

The BMFT catalogue compiled by ZAED, contains a bibliography of research reports in nuclear engineering (BMFT-KN K) from 1965 to 1975 and reports on data processing (BMFT-FB DV) from 1971 to 1975. (Atomindex citation 10:424073)

INIS-mf-4749 PC **A02**/MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
AAEC Report Titles Cumulation, 1976-1977.
Aug 78, 20p
U.S. Sales Only.

The publication lists all unclassified technical reports issued by the Australian Atomic Energy Commission Research Establishment during 1976 and 1977. (Atomindex citation 10:431148)

KFK-2625 PC **A06**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.).
List of Scientific Publications from the Karlsruhe Nuclear Research Centre of the Year 1977.
Mar 78, 108p
In German.
U.S. Sales Only.

The scientific and technical-scientific publications from the Karlsruhe Nuclear Research Centre comprise books, original papers in scientific or technical journals, diploma, doctoral and habilitation theses, as well as papers held at scientific conferences, patents, KfK reports, and external reports (KfK = Kernforschungszentrum Karlsruhe). The present report, KfK 2625, contains the titles of the 1977 publications, scientific papers being listed only after the manuscript has been filed in the Central Library of the research centre. As for patents, the titles given refer to either first issues of a patent, or to patents laid open for inspection. Progress reports are listed according to subjects involved. The whole list of publications is ordered according to the names of institutes and of projects, the latter group covering the titles of published project reports and of publications written by individual cooperators of a given project, as well as publications printed by the Karlsruhe Nuclear Research Centre, written by cooperators of the following projects: 'Process control with data processing plants', (PDV), and 'Computer-assisted development' (CAD). These projects are carried out together with other firms and institutes. Yet another group of publications covered are those of the Federal Institute for Food Research, and of guest scientists working in the Centre. (Atomindex citation 10:427582)

LBL-10803 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
DCN/SEEDIS. Annual Report, FY 1979.
Jun 80, 21p
Contract W-7405-ENG-48

The Distributed Computer Network (DCN) is designed to provide a nationwide homogeneous minicomputer network to support planning and analysis activities for the Department of Labor (DOL) regional and national offices. DCN provides a distributed environment which provides shared access to DOL data bases and sophisticated data retrieval, analysis, and display capabilities. The national office and each regional office will be provided with the capability to manage its own data bases, make appropriate data bases available to all offices on the network, and access data bases on the network. Activities concerning the following are summarized for DCN: hardware systems; mass-storage systems; software acquisition; LBL-supplied software; data base management systems; networking and communications; and training and technical support. The section on SEEDIS includes: transfer of SEEDIS to the DCN; future directions for SEEDIS; and archiving the SEEDIS data bases. The Labor Market Projections Model and the ESARS Data Project are also summarized briefly. (ERA citation 05:029169)

LBL-11034 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Development of a Political Science Thesaurus.
B. A. Cerny. 5 Jun 80, 59p
Contract W-7405-ENG-48

The procedures used in developing a political science thesaurus for use by the DOE Technical Information Center and the Executive Office of the President Information Center are described. The classification scheme for terms in the political science thesaurus is given in an appendix, but only a one-page sample of the thesaurus itself is shown. (ERA citation 05:031449)

PB80-223852 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Financial and General Management Studies Div.
The Senate Should Explore Other Word Processing Alternatives to Improve Cost Effectiveness and Productivity.
Report to the Chairman, Committee on Appropriations, U.S. Senate.
17 Jul 80, 77p FGMSD-80-63

Word processing systems are essential to the offices of U.S. Senators who respond annually to over 11 million letters from their constituents. The annual cost for equipment and personnel to develop and process responses is estimated at over $28 million. The word processing systems now used by the Senate may not be the best to meet this workload. In the past 5 years, significant technological developments have produced some very powerful and flexible new systems. These new systems have the potential to help the Senate meet its growing correspondence workload, while at the same time reduce its work processing costs. The Senate should delay its planned purchase of the present computer-based word processing system until it thoroughly analyzes available alternatives.

PB80-225915 PC **A09**/MF **A01**
CMHC Systems, Inc., Columbus, OH.
Feasibility of Developing a Prototype Mini-Computer CMHC Management Information System,
John A. Paton. 1979, 182p
Contract PHS-278-78-0073
See also PB80-225907.

This report has been prepared to describe the feasibility of developing a prototype mini-computer CMHC management information system. The NIMH has provided reference materials, technical assistance, guidelines, and a staff college program to assist mental health centers in the development of information systems. As another step in this direction, the NIMH has funded this study to determine the feasibility of, and the requirements for, a prototype information system.

PB80-226590 PC **A06**/MF **A01**
Office of Education, Washington, DC.
Selected Bibliography of Egyptian Educational Materials: Volume 5, Number 2, 1979.
1980, 116p TT-79-59121/2
See also Volume 5, Number 1, PB80-207780. The above journal is translated on a regular basis. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

A bibliography of educational materials in Egypt cites publications dealing with various phases of academic and technical training. Abstracts are presented of books and articles on organization, faculties, students, and teaching methods. Other topics are administration, testing, illiteracy, textbooks, social aspects, objectives, and higher education.

PB80-226624 PC **A04**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Library Systems and Services.
Guide to EPA Libraries and Information Centers (Fifth Edition),
Barbara A. Pedrini. Aug 80, 52p EPA-OLSS-80-11

The fifth edition of this Guide provides background on the formation of each EPA library and describes the collection and services available. The Guide also lists each library's location, library code, hours of operation, commercial and FTS numbers.

PB80-227861 PC **A05**/MF **A01**
Mathematics and Computation Lab. (FEMA), Washington, DC.
PDP 11/45 Document Processing System Reference Manual.
Final rept.,
Nathan J. Ray. Jul 80, 100p TM-279

The PDP 11/45 Document Processing system combines the benefits of rough draft typing with those of electronic computers. Manuscripts may be stored electronically and may be corrected without having to retype the entire document. The Document Processor executes as a Time-Shared application under the STAMOS Time-Sharing System on the PDP 11/45 computer. The system may be accessed via the dial-up telephone network, however, procedures of the MCL project management system must be followed to ensure access.

PB80-856990 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Engineering Information Systems. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 94p
NERACUSGNT0433
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe and analyze various engineering information systems currently in operation. Among the information and

data bases discussed are NASA information systems, Engineering Index data base and The Westinghouse Hanford Company information system. (Contains 083 citations.)

PB80-857006 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Engineering Information Systems. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 28p NERACEI NT0433
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the uses, benefits and design of engineering information systems. Also included are discussions on the role of information systems in engineering and instrumentation for such data bases. (Contains 030 citations.)

RISO-M-2189 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
List of Selected Publications 1978 Risoe National Laboratory.
Sep 79, 32p
U.S. Sales Only.

The list comprises a selection of scientific and technical publications of Risoe National Laboratory and its staff during 1978. Journal articles, conference papers, and reports are included. The publications are arranged in the following broad subject categories: Reactor Safety Technology, The Nuclear Fuel Cycle, Environmental and General Safety Research, Materials Research, Radiation Technology, Agricultural Research, Non-Nuclear Energy Research, General. (Atomindex citation 11:509337)

SAND-80-0530 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Who Dunnit. A Crash Course in Style for Sandia Authors.
L. S. Lopez. Jul 80, 65p
Contract AC04-76DP00789

This report presents a short course for the busy engineer-scientist who wants to write reports that meet minimum standards of modern technical writing. The text stresses some cardinal rules of good writing: personal pronouns, strong verbs, active voice, clear expression, and avoidance of jargon and noun modifiers. (ERA citation 05:031451)

UJV-4835-V PC **A03**/MF **A01**
Ustav Jaderneho Vyzkumu, Rez (Czechoslovakia).
Improved Information Services at the Nuclear Research Institute - Factual Information and Modernization of Reprographic Base.
L. Vymetal. Feb 79, 27p
In Czech.
U.S. Sales Only.

The ways are shown of the possible improvement of information services at UJV by regular scanning data information on nuclear power. The prospects and the concept are outlined of the data information system in Czechoslovakia and its subject scope is suggested. The method of decision-making analysis is described as applied to the selection of duplicating equipment whose purchase is to modernize the reprographic base. (Atomindex citation 11:509313)

5C. Economics

AD-A088 261/3 PC **A04**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL.
Local Economic Consequences Study (LECS) Preliminary User Manual.
Interim rept.,
J. W. Hamilton, and R. D. Webster. Jul 80, 74p
Rept no. CERL-IR-N-94

This study has developed and documented a subsystem of the Environmental Technical Information System (ETIS) which provides easy, systematic access to the U.S. Air Force Local Economic Consequences Study (LECS) methodology. The system has been further implemented and is now available to Air Force users as a pilot system until further modifications and extensions are made. This document provides user instructions and identifies sources of required data. (Author)

BNL-51056 PC **A03**/MF **A01**
National Center for Analysis of Energy Systems, Upton, NY.
Brookhaven Integrated Energy/Economy Modeling System and its Use in Conservation Policy Analysis.
P. J. Groncki, and W. Marcuse. Jul 79, 35p
Contract AC02-76CH00016

The approach used at BNL to model the impact of the introduction of advanced energy technologies in response to increased energy prices has been to link econometric, process, and input-output models. The econometric model generates growth, employment, productivity, inflation, final demand, and price-determined input-output coefficients for a ten-sector interindustry model. The outputs from the six energy sectors are used to drive a national energy process model which supplies energy prices, fuel mix, and energy capital requirements to the econometric model. The four nonenergy final demands from the econometric model are disaggregated and used with the energy demands from the process model to drive a 110-sector input-output model. The nonenergy coefficients in the input-output model are fixed, but the energy coefficients are variable - reflecting the technologies chosen by the solution of the process model. Coefficients representing advanced-energy-technology production functions have been incorporated in the input-output structure. This approach is briefly described, and three applications of this set of linked models are presented: (1) reports the findings of a study of the effects of various levels of conservation on the rate of growth in GNP and other economic indicators; (2) describes an application of the linked models to an accelerated solar-technology scenario, focusing on the long-run macroeconomic impacts of increased solar utilization; and (3) currently in progress, examines the robustness of two policies (a supply and a demand policy) and their effect on the penetration of renewable technologies across a range of reference cases designed to capture several of the uncertainties faced by decision makers. 63 references. (ERA citation 05:029166)

DIB-80-10-500 PC**$10.00**/MF **A01**
International Trade Administration, Washington, DC.
Operations Market Research Business Equipment and System in Singapore.
Foreign market survey rept.
Aug 80, 53p
U.S. sales only for 8 months. Available to foreign addressees in May 81.

The report contains a market assessment for business equipment and systems in Singapore. The potential market size and sources of supply for business equipment are discussed. Market access data are provided.

DIB-80-10-501 PC**$10.00**/MF **A01**
ASI Market Research, Inc. (Korea).
Korean Market Survey: Plastic Products Production, Machinery and Raw Materials.
Foreign market survey rept.
16 Jan 80, 31p
U.S. sales only for 8 months. Available to foreign addressees in May 81.

The report contains a market assessment for plastic processing machinery and raw materials in South Korea. The competitive environment, future demand, and market access data for plastics products and machinery are discussed.

DIB-80-10-502 PC**$10.00**/MF **A01**
International Trade Administration, Washington, DC.
The Saudi Arabian Business Equipment and Information Systems Market.
Foreign market survey rept.
Jun 80, 44p
U.S. sales only for 8 months. Available to foreign addressees in May 81.

The report contains a market assessment for business equipment and information systems in Saudi Arabia. The potential market size and user attitudes are discussed.

DOE/EIA/AR-0221 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Filling the Strategic Petroleum Reserve: Its Price and Economic Effects.
E. S. Paul. Mar 80, 52p

The estimated movements of the economic indicators under the 1989 target plan (with no OPEC retaliation) are small and could be considered almost negligible when viewed against the size of the economy and the error properties inherent in the macroeconomic model. Therefore, it cannot be firmly stated that a significant loss in real output and increases in inflation and unemployment occur in filling the Reserve. Accelerating the fill rate to meet the 1985 Target (without OPEC retaliation) could increase world oil prices from $0.90 to $1.00 above the base case of no Reserve buildup for the year 1980 to 1985. For the same period, this results in an estimated average decrease in real output of 0.6 percent per year below the baseline level for the United States, an increase in the inflation rate by an average of 0.3 percentage points per year, and an increase in the unemployment rate by an average of 0.2 percentage points per year above their baseline values. In the OPEC retaliation scenario, the world oil price is projected to rise immediately by 19.6 percent above its baseline level, and, by 1985, to be 6.1 percent above the baseline level for the 1989 Target, and 8.4 percent for the 1985 Target. The average loss in real output in the United States could be 0.8 percent below the baseline value for the year 1980 to 1985 for 1985 and 1989 Targets. The GNP deflator could be greater by an average of 0.8 percentage points, and the unemployment rate greater by an average of 0.5 percentage points per year when compared with their baseline values. (ERA citation 05:026887)

DOE/EIA-6039-01 PC **A08**/MF **A01**
California Univ., Santa Barbara. Community and Organization Research Inst.
Price Controls and International Petroleum Product Prices.
R. T. Deacon, W. J. Mead, and V. B. Agarwal.
Feb 80, 164p
Contract AT03-79ET15391

The effects of Federal refined-product price controls upon the price of motor gasoline in the United States through 1977 are examined. A comparison of domestic and foreign gasoline prices is made, based on the prices of products actually moving in international trade. There is also an effort to ascribe US/foreign market price differentials to identifiable cost factors. Primary emphasis is on price comparisons at the wholesale level, although some retail comparisons are presented. The study also examines the extent to which product price controls are binding, and attempts to estimate what the price of motor gasoline would have been in the absence of controls. The time period under consideration is from 1969 through 1977, with primary focus on price relationships in 1970-1971 (just before US controls) and 1976-1977. The foreign-domestic comparisons are made with respect to four major US cities, namely, Boston, New York, New Orleans, and Los Angeles. 20 figures, 14 tables. (ERA citation 05:026393)

DOE/IA-0010 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Office of Current Reporting.
International Energy Indicators.
Jun 80, 40p

Data are presented in graphs and tables on the following: Iran: crude oil capacity, production, and shut-in, monthly, June 1974 to May 1980; Saudi Arabia: crude oil capacity, production, and shut-in, monthly, March 1974 to May 1980; OPEC (Ex-Iran and Saudi Arabia): capacity, production and shut-in, monthly, June 1974 to April 1980; non-OPEC Free World and US production of crude oil, monthly, January 1973 to March 1980; oil stocks: Free

World, US, Japan, and Europe (landed), 1973 to first quarter 1980; petroleum consumption by industrial countries, monthly, January 1973 to December 1979; USSR crude oil production, monthly, January 1974 to May 1980; Free World and US nuclear generation capacity, monthly, January 1973 to April 1980; world crude oil production by area, annually, 1947 to 1979; estimated proved world reserves of crude oil, annually, January 1, 1948 to 1980; world marketed production of natural gas, annually, 1950 to 1979; estimated proved world reserves of natural gas, annually, January 1, 1967 to 1980; US trade in natural gas, 1955 to 1979; US imports of crude oil and products, monthly, January 1973 to May 1980; landed cast of Saudi crude oil in current and 1974 dollars, monthly, April 1974 to March 1980; US trade in coal, monthly, January 1973 to April 1980; summary of US merchandise trade, 1976 to April 1980 and Energy/GNP ratio, annually, 1947 to 1949 and, quarterly, first 1973 to first 1980. (ERA citation 05:029164)

DOE/NE-0009 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Power Plant Capital Investment Cost Estimates: Current Trends and Sensitivity to Economic Parameters.
Jun 80, 63p
Contract W-7405-ENG-26

This report describes power plant capital investment cost studies that were carried out as part of the activities of the Plans and Analysis Division, Office of Nuclear Energy Programs, US Department of Energy. The activities include investment cost studies prepared by an architect-engineer, including trends, effects of environmental and safety requirements, and construction schedules. A computer code used to prepare capital investment cost estimates under varying economic conditions is described, and application of this code is demonstrated by sensitivity studies. (ERA citation 05:027226)

DOE/RG-0033 PC **A06**/MF **A01**
Department of Energy, Washington, DC.
United States/Mexico Electricity Exchanges.
May 80, 120p

As a result of the agreement between the respective presidents, a joint study was undertaken to analyze the possibilities of increasing the international electricity exchange between the two countries. Responsibility for this undertaking was assigned to the United States Department of Energy (DOE) and to the Direccion de Energia de Mexico (DEM) through the Comision Federal de Electricidad (CFE). Representatives from Mexico and the US were chosen from the regional utilities along the border between the two countries and made up working groups that particiated in the study. With the support of both governments, and a high degree of cooperation between the two countries, work on the study was completed within fourteen months The completion of the study has been a major step in broadening the base of bilateral energy relations. the study highlights the opportunities for increased electricity exchanges, which could increase cooperation along the common border. Expansion of electricity interchange could offer substantial economic benefit to both countries, both directly and indirectly. Direct benefits include increased reliability of electric power and cost savings through economies of scale and diversity of peak demand patterns. Indirect benefits include improved economic and employment opportunities, especially in the border areas of both countries. This report provides background on the history of past exchanges and the characteristics of the US and Mexico electric systems, a summary of opportunities and incentives, and suggestions for procedures to remove obstacles and constraints. (ERA citation 05:029198)

DOE/RG-0036 PC **A99**/MF **A01**
Department of Energy, Washington, DC. Economic Regulatory Administration.
Electric Power Supply and Demand for the Contiguous United States, 1980-1989.
Jun 80, 651p

A limited review is presented of the outlook for the electric power supply and demand during the period 1980 to 1989. Only the adequacy and reliability aspects of bulk electric power supply in the contiguous US are considered. The economic, financial and environmental aspects of electric power system planning and the distribution of electricity (below the transmission level) are topics of prime importance, but they are outside the scope of this report. (ERA citation 05:027283)

DOE/RG/09154-T1 PC **A11**/MF **A01**
Illinois Office of Consumer Services, Springfield.
Consumer's Guide to the Economics of Electric-Utility Ratemaking.
May 80, 244p
Contract FG01-79RG09154

This guide deals primarily with the economics of electric utilities, although certain legal and organizational aspects of utilities are discussed. Each of the seven chapters addresses a particular facet of public-utility ratemaking. Chapter One contains a discussion of the evolution of the public-utility concept, as well as the legal and economic justification for public utilities. The second chapter sets forth an analytical economic model which provides the basis for the next four chapters. These chapters contain a detailed examination of total operating costs, the rate base, the rate of return, and the rate structure. The final chapter discusses a number of current issues regarding electric utilities, mainly factors related to fuel-adjustment costs, advertising, taxes, construction work in progress, and lifeline rates. Some of the examples used in the Guide are from particular states, such as Illinois and California. These examples are used to illustrate specific points. Consumers in other states can generalize them to their states and not change the meaning or significance of the points. 27 references, 8 tables. (ERA citation 05:029199)

DOE/S-0011 PC **A04**/MF **A01**
Department of Energy, Washington, DC.
Final Report to the President on Oil Supply Shortages During 1979.
Jul 80, 62p

Stockpile levels at the beginning of 1979, imports during the first half of the year, and inventory management were primarily responsible for the oil supply shortage in the spring and summer of 1979. There was a 3.1% reduction in oil supply in May to July of 1979 relative to the same period in 1978, and a 0.2% reduction relative to 1977. The reduction in available oil between 1979 and previous years was even greater than the reduction in supply. Domestic production of crude oil declined between May to July of 1978 and the same period in 1979. This was consistent with the long-term trend. Free-world oil production dropped by about 2 million b/d during the first quarter of 1979 as a result of the loss of Iranian production. Production returned to pre-disruption levels by the middle of 1979. The US share of free-world oil supply dropped by 2% in the second quarter of 1979 compared to the 1977-78 average. Gasoline supplied to consumers during May to July 1979 was 8.5% less than in the same period in 1978, and 7 to 9% less than the amount that would have been consumed if there had been no supply restriction. Compared to 1978, reduced gasoline production during this period in 1979 accounted for 36% of the supply reduction, and reduced use of stocks accounted for 64% of the supply reduction. Refiners could have made more gasoline available during May to July of 1979 without reducing stocks below minimum operating levels. The yield of gasoline relative to other petroleum products went down in May to July of 1979 as compared to the same period in 1977 and 1978. Most of the increase was in production of petrochemical feedstocks. Refiners who were bound by DOE price controls or who were complying with CWPS guidelines could not have increased allowable revenues by delaying the sale of gasoline. Virtually all of the gasoline price increases that took place between January and August 1979 were based on cost increases. (ERA citation 05:030191)

HRP-0031214/0 PC **A04**/MF **A01**
Hospital Educational and Research Fund, Albany, NY.
Antitrust Laws: A Barrier to Cooperative Efforts of Health Care Providers.
Final rept.
1979, 65p
Contract PHS-PLD-70962-79

See also HRP-0031215.

A 1979 conference investigated whether antitrust laws are a barrier to cooperative efforts of health care providers. The conference, sponsored by the Hospital Educational and Research Fund and the Hospital Association of New York State, was held in Rochester, N.Y. Participants included representatives of hospitals, health systems agencies, health planning organizations, and the State and Federal government. The question of whether a conflict exists between antitrust laws and multi-institutional arrangements for health care delivery was considered. It was concluded that a conflict did exist and recommendations were made for its resolution. The topics discussed include: a history of health planning legislation, attitudes toward multi-institutional arrangements, health systems agency issues, hospital activities, and hospital case studies. The effects of planning on demand, the intention of New York State to shield institutions from antitrust actions arising from certificate of need procedures, and the utility of institutional or regional health systems plans were also explored.

HRP-0031215/7 PC **A08**/MF **A01**
Hospital Educational and Research Fund, Albany, NY.
Antitrust Laws: A Barrier to Cooperative Efforts of Health Care Providers. A Report of the Meeting of March 9, 1979, Rochester, NY.
1979, 157p
Contract PHS-PLD-70962-79
See also HRP-0031214.

A 1979 conference investigated whether antitrust laws are a barrier to cooperative efforts of health care providers. The conference, sponsored by the Hospital Educational and Research Fund and the Hospital Association of New York State, was held in Rochester, N.Y. Participants included representatives of hospitals, health systems agencies, health planning organizations, and the State and Federal government. The question of whether a conflict exists between antitrust laws and multi-institutional arrangements for health care delivery was considered. It was concluded that a conflict did exist and recommendations were made for its resolution. The topics discussed include: a history of health planning legislation, attitudes toward multi-institutional arrangements, health systems agency issues, hospital activities, and hospital case studies. The effects of planning on demand, the intention of New York State to shield institutions from antitrust actions arising from certificate of need procedures, and the utility of institutional or regional health systems plans were also explored.

HRP-0031637/2 PC **A05**/MF **A01**
Congressional Budget Office, Washington, DC.
Tax Subsidies for Medical Care: Current Policies and Possible Alternatives.
Jan 80, 78p

The report evaluates the exclusion of employer health contributions from the taxable income of employees, medical expense deductions, and tax-exempt financing for private hospital projects. Tax provisions affecting medical care do not appear as direct spending measures in Federal subsidies for health care, representing revenue losses in excess of $14.5 billion or 25 percent of the Federal Government's direct expenditures for health care. Employer exclusions of employer contributions to health and accident insurance plans from taxable income stimulate health insurance coverage but these exclusions have an adverse impact on the level of medical care spending. Alternatives to employer exclusions are: limiting exclusions to a fixed dollar amount; requiring that tax-subsidized policies have certain features to reduce the inflationary effect of exclusions; and coverting exclusions to a tax credit with a fixed dollar ceiling. Several alternatives to medical deductions are also available: changing deductions to a tax credit; raising the minimum for deductions; and providing catastrophic health insurance. The use of tax-exempt bonds to finance capital projects and private hospitals is examined in relation to the desirability of Federal subsidies and policy options for tax-exempt bonds. Supporting tables are provided.

N80-29854/0 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.

Solar Energy System Economic Evaluation: Ibm System 2, Togus, Maine.
Final Report.
Jul 80, 95p NASA-CR-161510
Contract NAS8-32036
Sponsored in Part by DOE.

The economic analysis of the solar energy system, is developed for Torgus and four other sites typical of a wide range of environmental and economic conditions in the continental United States. This analysis is accomplished based on the technical and economic models in the f-chart design procedure with inputs taken on the characteristics of the installed system and local conditions. The results are expressed in terms of the economic parameters of present worth of system cost over a projected twenty year life, life cycle savings, year of positive savings and year of payback for the optimized solar energy system at each of the analysis sites. The sensitivity of the economic evaluation to uncertainties in constituent system and economic variables is also investigated. Results demonstrate that the solar energy system is economically viable at all of the five sites for which the analysis was conducted.

PB80-217250 PC **A07**/MF **A01**
Talbert, Cox and Associates, Inc., Roanoke Rapids, NC.
The Halifax County Industrial Park Study, for the City of Roanoke Rapids, North Carolina.
1 Aug 80, 141p EDA-80-0121
Grant EDA-04-06-01799

The study is divided into three parts. Part one is an inventory of the existing industrial park and general Halifax County conditions. Part two develops scenarios of possible kinds of industrial clients. Part three discusses factors affecting implementation of Halifax County industrial parks including their economic feasibility. Roanoke Rapids and Halifax County have potential for a substantial industrial and commercial base industry.

PB80-217284 PC **A05**/MF **A01**
Old Colony Planning Council, Brockton, MA.
Summary Report on Title IX Adjustment Strategies for the Old Colony Economic Development District, Massachusetts.
Aug 80, 91p EDA-80-0127

The report is a summary of the activities of the Old Colony Planning Council. The primary intent of the year long grant has been a study of the footwear industry and the development of a comprehensive adjustment strategy to deal with the dislocation of shoe workers and the stabilization of the industry in the Old Colony area. The grant also addressed the reemployment needs of the unemployed as well as the economic adjustment needs of the Old Colony Economic Development District. The report summarizes the problems of the footwear industry and the area economy, and suggests multi-faceted strategies for the stabilization and district's major economic development goal.

PB80-218571 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Journal of International Trade. Volume 3, Number 18, September 8, 1980.
Bi-weekly pub.
8 Sep 80, 40p
See also Volume 3, Number 15, PB80-210040.
Paper copy available from Supt. of Docs.

The periodical contains articles that discuss the export help given to three U.S. industries by the Commerce Department and marketing campaigns with China. Also included is an article about an American Indian firm which developed a technique for recycling iron-oxide wastes by resmelting.

PB80-222862 PC **A04**/MF **A01**
Broder (Ivy E.), Washington, DC.
Evaluating the Net Cost Per Job of the 1977 Economic Stimulus Package.
Final rept.,
Ivy E. Broder. Feb 80, 70p ASPER/PUR-80/0684/A

The purpose of this study is to access to net cost per job of various programs included in the 1977 Economic Stimulus Package using a consistent methodology for each program. This package consists of a Public Works Program, a Public Service Employment Program, Anti-Recessionary Fiscal Assistance (countercyclical revenue sharing), an Employment Tax Credit, and a tax cut. In order to find the net cost per job for public works, public service employment and countercyclical revenue sharing, the following methodology was used: (1) Estimating direct employment per billion dollars; (2) Estimating secondary employment per billion dollars; (3) Estimating the percentage of federal funds that displaced local funds and reducing the number of jobs obtained in (1) and (2) by that percentage; (4) Determining the use of displaced funds; (5) Estimating the jobs created by the displaced funds and adding those to (3); and (6) Determining the recaptures to the Treasury and reducing the cost per billion by that amount.

PB80-223100 PC **A05**/MF **A01**
Dartmouth Coll., Hanover, NH. Dept. of Economics.
Analyzing the Relation of Unemployment Insurance to Unemployment.
Final rept. Aug 79-Jun 80,
Alan Gustman. Jun 80, 80p ASPER/PUR-79/4787/A
Contract DL-B-9-M-9-4787

The paper presents a framework for analyzing the relation of unemployment insurance to unemployment and applied the framework to evaluate recent developments in the UI literature and future research needs. Unemployment is decomposed into more basic elements related to the labor market flows which determine unemployment incidence and duration. It is also disaggregated by reason for unemployment -- e.g., entry into the labor force or quit last job. A matrix containing those definitional elements of unemployment which may be affected by variations in characteristics of the UI system is central to the framework. The discussion of each of these elements focuses on recent theoretical and empirical studies which analyze how they are influenced by features of the UI system. By proceeding systematically through the elements which comprise unemployment and considering the major behavioral explanations linking the unemployment insurance system to unemployment; it is possible to determine where the analysis has proceeded satisfactorily and where major gaps remain.

PB80-224066 PC **E06**/MF **A01**
California State Dept. of Water Resources, Sacramento.
Measuring Economic Impacts: The Application of Input-Output Analysis to California Water Resources Problems,
W. O. Schink, and J. C. Fitz. Mar 80, 183p BULL-210, W80-06560, OWRT-C-7513(6234)(1)
Contract DI-14-34-0001-6234
Includes four sheets of 48X reduction microfiche.
Errata sheet inserted.

The study describes the development and application of a California statewide and twelve intrastate regional input-output (I-O) models. The statewide model, developed for 1976, consists of 156 sectors with emphasis on high water users, including 36 agricultural categories. The model is resource-oriented, providing estimate of direct and secondary employment, and of energy and water resource use for every million dollars of final demand sales. These resource uses vary by industry, depending on the industry, the resource considered, and the intensity of resource use by related industries. Details of the models and their application, including microfiches of the complete statewide transactions, technical coefficients, and inverse tables, are presented for those interested in the technical aspects of the models or in making further applications.

PB80-224207 PC **A11**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
A Study to Determine If Farmers Home Administration Should Authorize the Use of Insured and Guaranteed Loan Funds for Hedging Farm Commodities,
Chester A. Bailey. Jul 80, 242p AU/IAPFM-84-79-6

The study involves the use of hedging as a financial management tool. It provides facts, specific perceptions, attitudes and assessments of the feasibility of using FmHA insured and guaranteed loan funds for the purpose of paying hedging margins and associated costs. The study provides a number of sources of information designed to provide a balanced view of the problems and successes of hedging agricultural commodities.

PB80-226434 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Journal of International Trade, Volume 3, Number 19, September 22, 1980.
Bi-weekly pub.
22 Sep 80, 49p
See also Volume 3, Number 17, PB80-223407.
Paper copy available from Supt. of Docs.

The journal contains the following articles: MTN: Implementing the New Trade Rules; Tariff Agreement Opens Opportunities in Japan; Japan Missions Respond to Auto Trade Problems; President Acts to Reduce Disincentives to Exporters; and Trieste: Gateway to Eastern Europe.

PB80-226483 PC **A12**/MF **A01**
International Customs Tariffs Bureau, Brussels (Belgium).
Venezuela: International Customs Journal. 21st Edition, Year 1980-1981.
Bulletin.
Jul 80, 259p BULL-30
See also 20th Edition, PB-299 841.

The journal contains the customs tariff schedule for Venezuela. A description of goods and legislation are presented with the general tariff rates.

PB80-226616 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Program Analysis Div.
An Analytical Framework for Federal Policies and Programs Influencing Capital Formation in the United States.
Report to the Congress.
23 Sep 80, 93p PAD-80-24

The report presents an overview of the process of capital formation in the United States economy. The slow rate of capital formation in the 1970's was a major contributor to the serious economic problems experienced during the past decade. This report describes how capital formation occurs, the many different aspects of the process, and why it is such an important national economic issue. It presents an analytical framework which is useful in pinpointing where problems can arise. It describes the potential effects of current Federal programs, activities, and policies on the rate of capital formation.

PB80-227036 PC **A04**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Developments in Freight Transport,
P. J. Corcoran, A. J. Hitchcock, and C. M. McMahon. c1980, 59p TRRL-SUPPLEMENTARY-580

Probable developments in freight transport in Great Britain over the next 20 years were investigated in a series of interviews with transport operators and users. The report of the study presents an analysis of past trends in freight transport by the four main modes (road, rail, water and pipeline) and discusses likely future technical and operational developments in freight transport modes and distribution management. The future demand for freight transport is analyzed in terms of the effects of economic factors, industrial structure and location, transport policies, non-transport policies and energy costs. The study reaches a number of broad qualitative conclusions about the economic and environmental impacts of these changes in the period 1980-2000.

PB80-227218 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
The Estimation of Parameters of Normal Distributions from Data Restricted to Large Values.
Current papers,
F. E. Rogers. c1978, 21p CP-8/78

In this paper extreme value theory has been used to analyze fire data (to give information on overall

losses in particular industries and on the value of various fire protection measures etc.) when only information on large fires is known. The methods employed in these studies are however general and can be used to estimate the parameters of any normal distribution when only restricted data on large values is available. The paper compares three methods of making such estimations and shows that a high level of accuracy can be obtained with not more than 20 observations. This has obvious and potentially far reaching implications for great economy in the collection and processing of many kinds of data. (Copyright (c) British Crown Copyright.)

PB80-227879 PC **A03**/MF **A01**
Mathematics and Computation Lab. (FEMA), Washington, DC.
Development of an IDEAS (Industrial Disruptions Economic Analysis System) Critical Industries Strike Impact Assessing System.
Final rept.,
Kern O. Kymn. Jun 80, 50p TR-111
Prepared in cooperation with West Viginia Univ., Morgantown under Contract DACA31-C-0058.

A strike experience model has been developed by extending the adaptive form of expectations. This model has been applied to the steel industry. Integrating the possible candidates of an emergency signal into the model, it was found that man-days idle during the year, as percent of total working time, can serve as an emergency indicator. The study reports other results that would enhance the understanding of the strike behavior.

PB80-851157 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Product Liability. December, 1975-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Dec 75-Jun 80,
William V. Sassi. Aug 80, 170p NERACEI NT0475
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography emphasize the reliability, safety, quality control, and corporate strategies for production of commercial products. Case histories are used to reinforce particular articles. Also mentioned are views from an actuarial and legal standpoint. (Contains 200 citations.)

PB80-853344 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Product Liability. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 31p NERACUSGNT0475
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the reliability, quality, standards, and corporate strategies for production of commercial products in view of product liability trends. (Contains 022 citations.)

PB80-854755 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Forecasting New Products. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 21p NERACEI NT0873
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the methods and techniques used in the forecasting or predicting of new product introduction to the consumer. Also included is a discussion of the methods used for estimating the demand for new products. (Contains 024 citations.)

PB80-856362 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Public Utility Rate Structures. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 112p NERACEDBNT1047
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the methods, procedures, and issues of determining public utility rate structures. Citations include descriptions of regulatory policies (local, state, and federal), demand and marginal cost projections, retail electric rates, elasticity, subsidies, rate reforms, equity determination, risk assessment, and mathematical models. (Contains 094 citations.)

PB80-856719 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pricing Methods. December, 1976-June, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 76-Jun 80,
William V. Sassi. Jun 80, 234p NERACUSGNT0967
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss and analyze pricing methods, techniques, and policies for various industries and businesses. Also discussed are the economic aspects and impacts of various pricing strategies. (Contains 200 citations.)

PB80-856727 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pricing Methods. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 139p NERACEI NT0967
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss and analyze pricing methods, techniques, and policies for various industries and businesses. Also discussed are the economic aspects and impacts of various pricing strategies. (Contains 150 citations.)

PB80-856735 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pricing Methods. March, 1978-May, 1980 (Citations from the Energy Data Base).
Rept. for Mar 78-May 80,
William V. Sassi. Jun 80, 215p NERACEDBNT0967
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss and analyze pricing methods, techniques, and policies for various industries and businesses. Also discussed are the economic aspects and impacts of various pricing strategies. (Contains 200 citations.)

PB80-928007 PC **E03**/MF **A01**
Central Intelligence Agency, Washington, DC.
Some Perspectives on Oil Availability for the Non-OPEC LDCs.
Research paper.
Sep 80, 61p ER-80-10493
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928000.

The report, one in a series of energy-related papers, presents data and insights on the petroleum supply problems of non-OPEC LDCs. This package is incomplete in country coverage and the development of petroleum-related topics. In no small measure, this is a function of the state of data collection in particular Third World countries. The gaps notwithstanding, it is felt that it would be useful to share with the private sector the available information because of the high interest in LDC energy problems.

PB80-928008 PC **E03**/MF **A01**
Central Intelligence Agency, Washington, DC.
Developed Country Imports of Manufactured Products from LDCs.
Research paper.
Sep 80, 40p ER-80-10476
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928000.

The principal purpose of this report is to show a cross sectional and time series analysis of less developed countries' (LDCs) exports of manufactured products to the developed countries (DCs). The analysis covers the years 1970 and concentrates on identifying key LDC exporters, important manufactured products sold to DC markets, and principal DC importers of LDC products. The penetration of specific DC markets by LDC exporters is also measured for both commodity and country markets.

PB80-928212 PC **E03**/MF **A01**
Central Intelligence Agency, Washington, DC.
China: International Trade Quarterly Review, First Quarter, 1980.
Research paper.
Sep 80, 26p ER/CIT-80-004
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928200.

This is the fifth in a series of quarterly reports on China's international trade. Exports rose by 52 percent over the same period last year, while imports were up only 16 percent, resulting in a trade surplus in the first quarter. Beijing remains firmly committed to expanding economic relationships with the West, but current economic problems indicate that the process is likely to evolve slowly. Beijing is instituting a decentralization program in its foreign trade system to increase hard currency earnings to help finance industrial modernization.

UCID-18611 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Energy and Productivity: Implications for Real Income and Inflation.
R. L. Cooper. 23 May 80, 23p
Contract W-7405-ENG-48

Falling productivity growth over recent years has become one of the nation's foremost economic problems. This paper examines some possible causes, and concludes that, since 1973, rising energy prices have been responsible for most of the productivity growth decline. The paper also assesses the negative impact of past energy-price increases on the rate of inflation in the US. It concludes with discussions of the outlook for future productivity and energy prices and suggests appropriate policy responses such as incentive schemes and relaxation of regulatory practices. (ERA citation 05:029170)

5D. History, Law, and Political Science

AD-A088 002/1 PC **A02**/MF **A01**
Army War Coll Strategic Studies Inst Carlisle Barracks PA
Soviet Policy in the Middle East: Perspectives from Three Capitals.
Strategic issues research memo.,
Alvin Z. Rubinstein. 16 Jun 80, 20p

This memorandum evaluates the success of Soviet foreign policy in the Middle East. The author evaluates the success of Soviet policy by the following criteria: the changed configuration of regional alignments that emerge as a consequence of Soviet behavior; the extent to which US policy and interests are undermined; and the increments in Moscow's influence in specific countries or movements. The author concludes that Moscow views the Middle East as a growth stock--it really

doesn't need much in the way of dividends for the time being, although it has already reaped a good deal. (Author)

AD-A088 003/9 PC **A03/MF A01**
Army War Coll Strategic Studies Inst Carlisle Barracks PA
Soviet Power in Latin America: Success or Failure.
Strategic issues research memo.,
W. Raymond Duncan. 13 Jun 80, 33p

This memorandum explores the success of Soviet policy in the Caribbean and Latin America. The paper is divided into three sections: Soviet objectives; instruments of Soviet policy; and implications for the United States. (Author)

AD-A088 004/7 PC **A03/MF A01**
Army War Coll Strategic Studies Inst Carlisle Barracks PA
The Soviet Union and Angola.
Strategic issues research memo.,
Arthur J. Klinghoffer. 10 May 80, 37p

This memorandum considers the success of Soviet foreign policy in Angola. The author concludes that Soviet policy toward Angola must, at least temporarily, be viewed as successful. A political ally has been gained and, as a side effect of the Soviet role in Angola, contacts with states and liberation movements in the southern Africal region have been extended significantly. Soviet-Angolan relations have developed on a firm economic, military, and ideological basis. Thus, a short term dividend for the Soviets may gradually evolve into a long-term asset. (Author)

AD-A088 005/4 PC **A02/MF A01**
Army War Coll Strategic Studies Inst Carlisle Barracks PA
The USSR and Vietnam.
Strategic issues research memo.,
Douglas Pike. 7 May 80, 25p

This memorandum considers the relationship between the USSR and Vietnam. The author suggests that the bands of necessity which have held Vietnam to the USSR eventually will be loosened and the Vietnamese will seek to distance themselves from Moscow. He foresees no possibility that Vietnam will ever become a satellite of the USSR, in the manner of East Europe. He concludes that there appears to be a great paradoxical law at work in associating oneself with the Vietnamese: any successful relationship is an eventual catastrophe. Moscow may succeed where others have failed but more likely it too will become a victim of Vietnam. (Author)

AD-A088 293/6 MF **A01**
American Univ Washington DC Foreign Area Studies
Jordan: A Country Study.
3rd edition,
Richard F. Nyrop. Nov 79, 332p DA-PAM-550-34
Supersedes report dated 1974, AD-787 708.
Availability: Superintendent of Documents, GPO, Washington, DC 20402 HC $8.00. Number D 101.22:550. Microfiche furnished to DTIC (and NTIS) users.

Contents: Historical Setting; The Society and Its Environment; The Economy; Government and Policies; National Security.

DOE/EIA-0201/10 PC **A12/MF A01**
Department of Energy, Washington, DC. Energy Information Administration.
Energy Policy Study. Volume 10. Nuclear Power Regulation.
Z. D. Nikodem, A. W. Reynolds, and R. G. Clark.
May 80, 259p

This report examines the programs for regulating the safety, design, and operation of domestic nuclear power plants. The first part of the study describes the Federal and State regulatory procedures. It describes the legal foundations for the Federal licensing process and the associated State regulatory activities. It then analyzes the aspects of these procedures that affect the cost and supply of nuclear-generated electricity. The second part of this study examines the effects of nuclear safety regulations on the planning and construction lead time for nuclear power stations, the cost of nuclear power, and, ultimately, the decision to invest in nuclear power. (ERA citation 05:028999)

DOE/RG-0026/1 PC **A06/MF A01**
Department of Energy, Washington, DC. Office of Regulations and Emergency Planning.
Regulatory Analysis for Review and Establishment of Natural Gas Curtailment Priorities. Volume 1.
May 80, 120p

This report discusses important differences among alternatives for establishing natural gas curtailment priorities to deal with long-run supply shortages and short-run capacity shortages. Results from surveys and simulation of shortage costs for each alternative curtailment plan produced and major findings that are directly relevant for considering possible changes in the present curtailment system are discussed. This volume should be used to identify basic alternatives, to review findings which can guide review of any proposed policy change, and to gain a basic understanding of how curtailment alternatives were evaluated. This volume is sufficient for gaining an overall understanding of the effect that natural gas curtailment can have on both users and suppliers. (ERA citation 05:026904)

DOE/RG-0026/4 PC **A11/MF A01**
Department of Energy, Washington, DC. Economic Regulatory Administration.
Regulatory Analysis for Review and Establishment of Natural Gas Curtailment Priorities.
May 80, 234p
Contract AC01-78RG03355

Technical appendices in Volume 4 provide data and detailed explanations for each of the seven components into which policy evaluation has been divided: (1) delineation of alternatives and then simulation of shortages under each alternative in each prototype company, (2) supplier decisions and costs, including allocation rules, (3) user fuel substitution costs, (4) calculation of user shortage costs, supplier operating cost, and non-user pollution cost, (5) institutional factors affecting implementation, (6) annual demand and supply trends, and (7) national projections for economic and environmental summaries. In essence, there is increasing detail and more intricate discussion from Volume 1 to Volumes 2 and 3 and then to the Technical Appendices in Volume 4. Volume 4 should be used to gain understanding of the many different curtailment plans across the nation and to better appreciate the types and levels of costs that occur to both users and suppliers. The diagrams and discussions in Volume 4 will help the reader interpret the important concepts in designing and evaluating curtailment alternatives. The scenarios on demand and supply in Volume 4 can provide background for other studies. (ERA citation 05:026906)

DOE/RG-0035/1 PC **A05/MF A01**
Department of Energy, Washington, DC. Economic Regulatory Administration.
Public Utility Regulatory Policies Act of 1978: Natural Gas Rate Design Study.
May 80, 84p

The report concludes that, to effectively deal with our national energy problems, gas rate structures should be designed to reflect the costs which the nation avoids if gas is efficiently used and substituted for oil. Current pipeline and distribution company rate structures generally do not meet this test. Although gas is a substitute for oil in many applications, and conserved gas can reduce oil imports, gas rate structures often fail to convey to consumers the fact that, from a national perspective, gas is as valuable as oil. The provisions of the Natural Gas Policy Act of 1978 (NGPA) take a strong first step in correcting these problems. But, as clearly recognized in both NGPA and PURPA, these provisions need to be supplemented by updating pipeline and distribution company rate designs to address the problems of the 1980's - rather than the problems of the 1950's. In this regard, NGPA mandates incremental pricing, which raises the average price of gas to certain industrial users only. The Department of Energy (DOE) study suggests an alternate approach: pipeline and distribution rate structures that reflect in their tailblocks, for all customer classes, the economic costs of gas usage. Such rates would convey to all users the costs incurred by the nation as a consequence of their decisions to use or conserve gas. Such rate structures should promote the three purposes of PURPA - end-use conservation, efficient use of utility resources, and equitable rates - to a greater extent than do traditional accounting cost rate designs, which reflect decisions made in the distant past. (ERA citation 05:030201)

DOE/RG-0037 PC **A05/MF A01**
Department of Energy, Washington, DC. Economic Regulatory Administration.
Draft Regulatory Analysis: Notice of Proposed Rulemaking Motor Gasoline Allocation Revisions.
Jun 80, 92p

The Draft Regulatory Analysis is prepared for those proposed regulations which either may have a major impact on the general economy, individual industries, or geographic regions and levels of government, or may be significant in that they affect important DOE policy concerns and are the object of public interest. The problems and proposed solutions for the Notice of Proposed Rulemaking and Public Hearings on the Motor Gasoline Allocation Program are examined. The ERA's mandate for this program is set out in the Emergency Petroleum Allocation Act of 1973. Under this Act, the President is empowered to enforce, at his discretion, price and allocation controls on petroleum and petroleum products, including gasoline, through September 30, 1981. The Act sets the following allocation goals: protect public health; maintain public services and agricultural operations; foster competition in the petroleum industry; distribute petroleum among industry sectors and US regions equitably; and minimize economic disruption and unnecessary interference wth market mechanisms. (ERA citation 05:029186)

INIS-mf-4454 PC **A03/MF A01**
Nuclear Energy Agency, Paris (France).
Revision of the Paris Convention and the Brussels Supplementary Convention.
O. von Busekist. 1977, 28p CONF-7710196-27
Nuclear Inter June 1977, Florence, Italy, 2 Oct 1977.
U.S. Sales Only.

The Paris Convention and the Brussels Supplementary Convention have in substance remained unchanged since their adoption in 1960 and 1963, respectively. During that period, nuclear industry and technology have developed considerably while the financial and monetary bases of the Conventions have been shattered. The amounts of liability and compensation have been eroded by inflation, and the gold-based unit of account in which these amounts are expressed has lost its original meaning after the abolition of the official gold price. The question of revising the Conventions, in particular of raising those amounts and of replacing the unit of account, is therefore being studied by the Group of Governmental Experts on Third party Liability in the Field of Nuclear Energy of the OECD Nuclear Energy Agency. (Atomindex citation 10:438387)

INIS-mf-5391 PC **A09/MF A01**
Technische Hogeschool Twente, Enschede (Netherlands). Centrum voor Vraagstuken van Wetenschap en Samenleving.
Disarmament and Arms Control. The Role of Science and Technology.
B. Elzen. 1979, 251p
In Dutch.
U.S. Sales Only.

This report discusses how far science and technology can provide methods of making arms control and disarmament agreements more controllable in an objective way. Two case studies have been considered, the test ban treaty and the verification of the number of strategic nuclear weapons. These lead to the conclusion that both science and politics are closely interwoven and that, within what appear to be scientific arguments, political positions are being defended. Consequently scientists and technologists and the contexts in which they workplay a prominent role. (Atomindex citation 11:506153)

INIS-mf-5433 PC **A02**/MF **A01**
UKAEA Headquarters, London (England).
Summary of the Law Relating to Atomic Energy and Radioactive Substances as at March 1979.
D. F. Sim, and K. J. S. Ritchie. 1979, 21p
U.S. Sales Only.

This summary is intended to be a 'signpost' to the relevant law in the United Kingdom, but does not cover any aspect in detail. It falls under the following headings: common law; legislation (Atomic Energy Act 1946 and subordinate legislation; Radioactive Substances Act 1948 and subordinate legislation; Radioactive Substances Act 1960; Electricity (Amendment) Act 1961; Nuclear Installations Acts 1965 and 1969 and subordinate legislation; the Secretary of State for Trade and Industry Order 1970; Radiological Protection Act 1970 as amended by the Health and Safety at Work etc. Act 1974; Air Navigation (Restriction of Flying)(Atomic Energy Establishments) Regulations 1976; Nuclear Safeguards and Electricity (Finance) Act 1978; legislation relating to the United Kingdom Atomic Energy Authority); regulations under the Factories Act 1961; regulations relating to educational establishments; regulations and orders relating to food and medicines; regulations, rules etc. affecting the transport of radioactive materials; regulations under the Social Security Act 1975; control of import and export; the Euratom Treaty; important non-statutory codes of practice etc.; international conventions, regulations etc. relating to the peaceful use of atomic energy and radioactive substances, in which the United Kingdom is interested; foreign legislation. (Atomindex citation 11:509301)

INIS-mf-5558 PC **A02**/MF **A01**
UKAEA Headquarters, London (England).
Summary of the Law Relating to Atomic Energy and Radioactive Substances as of March 1979.
D. F. Sim, and K. J. S. Ritchie. 1979, 21p
U.S. Sales Only.

This Note contains summaries of new laws and regulations on atomic energy and radioactive substances and amendments made to previous ones in the United Kingdom as at March 1979, including international regulations and agreements. New materials referred to includes the Nuclear Installations (Excepted Matter) Regulations 1978, the Medicines (Radioactive Substances) Order 1978, the Medicines (Committee on Radiation from Radioactive Medicinal Products) Order 1978 and the Medicines (Administration of Radioactive Substances) Regulations 1978. The Note also reproduces other amendments in nuclear legislation, already referred to in a previous Note dated March 1978. (Atomindex citation 11:514668)

JPRS-76291 PC**$12.00**/MF**$3.00**
Joint Publications Research Service, Arlington, VA.
International Cooperation in Space, Legal Questions,
V. S. Vereshchetin. c25 Aug 80, 227p VAAP/SA-80/16
Trans. of mono. Mezhdunarodnoe Sotrudnichestvo v Kosmose, Pravovye Voprosy, Moscow, 1977. Sponsored in part by Foreign Broadcast Information Service, Washington, DC.

The report contains an examination of the broad range of new international legal problems which have arisen in international cooperation among states in the area of the research and use of space. A detailed analysis is provided of the legal bases in the international space programs of the Soviet Union, the United States, the Western European nations as well as other states, in addition to the legal conditions regulating the use of space for practical purposes.

PB80-217524 PC**$200.00**
Food and Drug Administration, Rockville, MD. Office of Legislative Affairs.
A Legislative History of the Federal Food, Drug, and Cosmetic Act and its Amendments. (Volumes 1-24 and Appendices A-J).
Rept. for 1933-73.
1973, 34000p FDA/ACLA-80/101
Consists of 34 reports, sold as SET ONLY.

The legislative history of the Federal Food, Drug, and Cosmetic Act and its amendments is comprised of 34 volumes: Volume 1-24 and Appendices A-J. The report contains a history of the various Acts, the bills introduced, Congressional Record and other information on the Acts.

SERI/TR-434-424 PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
National Energy Act Statutes and Solar Energy.
J. Howard. Feb 80, 70p
Contract EG-77-C-01-4042

The National Energy Act of 1978 contains many provisions that will significantly affect solar technology commercialization and solar energy users. Four of the five statutes that comprise the National Energy Act deserve close attention. The National Energy Conservation Policy Act will promote residential solar installations. The Energy Tax Act will accelerate both residential and commercial solar system applications. The Public Utilities Regulatory Policies Act promotes efficient use of utility resources as well as decentralized power production. And, the Power Plan and Industrial Fuel Use Act places severe restrictions on future burning of petroleum and natural gas, which should lead some operators to build or convert to solar energy systems. Each of the preceding acts are considered in separate sections of this report. Federal regulations issued pursuant to the various provisions are also identified and discussed, and some of the problems with the provisions and regulations are noted. (ERA citation 05:029188)

5E. Human Factors Engineering

AD-A088 011/2 PC **A03**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Methods for Developing Habitability Design Criteria.
Interim rept.,
Roger L. Brauer. Jul 80, 30p Rept no. CERL-IR-P-111

Habitability design criteria are concerned with the ability of facility users and occupants to perform their missions effectively, safely, and with satisfaction. The purpose of this study is to develop procedures that the Office, Chief of Engineers, Corps of Engineers division and district offices, and contractors can use to systematically prepare habitability design criteria. In the first phase of the study, reported here, a prototype procedure was developed and was pilot tested in preparation of an actual design criteria document. The major conclusion drawn from the pilot test is that the process for developing habitability design criteria is feasible, although improvements are necessary to make it more efficient and to increase the probability of quality in its application.

AD-A088 470/0 PC **A03**/MF **A01**
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
A Human Engineering Specification for Legibility of Alphanumeric Symbology on Video Monitor Displays (Revised).
Technical rept.,
E. L. Gorrell. Jun 80, 28p Rept no. DCIEM-TR-80-R-26
Revision of rept. no. DCIEM-TR-79X01, AD-A064 960.

Conventional human engineering legibility specifications for alphanumeric symbology displayed on video monitors consist of predictors of user performance derived from legibility research studies. Typical legibility predictors are symbol size, symbol luminance, contrast ratio, font, dot matrix dimensions, and pixel active area. This report discusses a number of significant problems associated with the development and application of conventional legibility specifications. In addition, it presents a detailed specification for comparative and objective evaluation of video monitor legibility performance based upon legibility tests developed for the USAF. This specification consists of criteria for subject selection, visual environment design, display monitor setup, test material design and presentation, legibility task scores, and legibility test performance. It is to be noted that this report is a revision of an earlier report. While the specification for the Legibility Test has not undergone any major change, the propose Minimum Conventional Legibility Criteria have been reduced in number. The revised report also includes a new appendix describing in detail a standardized procedure for measuring CRT symbol luminance and calculating contrast ratios.

AD-A088 478/3 PC **A02**/MF **A01**
Systems Research Labs Inc Dayton OH
A Test of Fitts' Law with Moving Targets,
Richard J. Jagacinski, Daniel W. Repperger, Sharon L. Ward, and Martin S. Moran. 1980, 10p
AMRL-TR-79-12
Contract F33615-76-C-5001
Pub. in Human Factors, v22 n2 p225-233 Apr 80.

No abstract available.

5F. Humanities

PB80-217797 PC **A03**/MF **A01**
Transportation Research Board, Washington, DC.
Household Activities, Budget Constraints, and Stability of Travel,
Antti Talvitie, Prahlad D. Pant, A. G. R. Bullen, Robert Meyer, and Yacov Zahavi. 1980, 49p
TRB/TRR-750, ISBN-0-309-03060-9
Library of Congress catalog card no. 80-21942. Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

The six papers in this report deal with the following areas: urban activities, travel, and time: relationships from national time-use survey; theory of destination choice-set formation under informational constraint; regularities in travel time and money expenditures; stability of travel components over time; examination of the psychophysical function in travel mode-choice behavior; and interdependencies in activity behavior.

PB80-226053 PC **A03**/MF **A01**
George Washington Univ., Washington, DC.
The Lenthall Houses, 612-614 9th Street NW., Washington, DC.: A Historical and Archeological Report.
Excavation rept.,
Thomas Kavanagh, and Susan Swasta. Aug 78, 34p DCHPO-1

A report on the excavation and documentary research of the backyards, outbuildings, and rear additions of the Lenthall Houses, a pair of townhouses built about 1800 in Foggy Bottom, in Northwest Washington, D.C. The buildings, the earliest extant houses in Foggy Bottom, were being moved to the 600 block of 21st Street N.W., to make way for a building to house the World Bank. The rear additions were demolished prior to the excavation. Features discovered included walls, a walkway, a brick-lined wall, a shist-lined well, and a circular brick feature. About 2000 artifacts were recovered, mostly glass, with some ceramics, and bone. The report emphasizes the sequence of ownership and construction and includes a series of plans of the yards showing the features.

PB80-226061 PC **A02**/MF **A01**
Smithsonian Institution, Washington, DC.
Excavations Around the Foundation of Friendship House.
Excavation rept.,
Jonathan Haas. Jul 79, 22p DCHPO-2
Sponsored in part by Friendship House, Inc., Washington, DC.

A report on test excavations along the foundation of Friendship House, 619 D Street, S.E., Washington, D.C., to determine if archeological resources would be destroyed in waterproofing the basement. The house, part of which dates to 1796, was a D.C. Historic Preservation Office administered Heritage conservation and Recreation Service historic preservation grant-in-aid project. Few arti-

facts were found as the excavation took place at the original front of the house. Most of the test pits contained mixed 19th and 20th-century artifacts that had been disturbed by construction and waterproofing in the 1930's. A quartz biface and obsidian scraper were also found.

PB80-226996 PC **A03**/MF **A01**
Maryland Dept. of Natural Resources, Annapolis. Coastal Resources Div.
Prehistoric Peoples of Maryland's Coastal Plain.
Nov 79, 30p NOAA-80061107

Eastern North America has abundant prehistoric remains, particularly along the coastline. However, modern land development practices in the coastal zone are rapidly disturbing and destroying prehistoric remains which are both irreplaceable and non-renewable, resulting in an incalculable loss of cultural and aesthetic heritage as well as a loss of scientific information. The prehistoric resources of Maryland's coastal zone, particularly Chesapeake Bay, provide an important natural laboratory for studying the interactions between changes in environment and prehistoric cultures through time. This report summarizes information on the environment of the Maryland coastal zone, emphasizing its changes during the time that prehistoric occupation is likely to have taken place and the implications these changes have had for prehistoric activities and the subsequent preservation of prehistoric remains. Also summarized is what is known of prehistoric occupation of the area and what ages and activities might be expected. Historic accounts of native groups at the time of European exploration are also discussed.

5H. Man-Machine Relations

AD-A088 316/5 PC **A05**/MF **A01**
Boeing Aerospace Co Seattle WA Data Processing Technology
Psychophysical Criteria for Visual Simulation Systems. Phase II. Experimental Investigations of Display Joints and Scene Inserts.
Final rept.,
Conrad L. Kraft, and Charles D. Anderson. Aug 80, 82p AFHRL-TR-80-18
Contract F33615-78-C-0012
See also Rept. no. AFHRL-TR-79-30 dated May 80, AD-A084 776.

This report describes the approach, procedures, and results of two psychophysical experiments to provide data useful in developing design criteria for visual simulation systems. The first dealt with the influence of the width of joints between display channels on the discrimination of vertical and rotational scene misalignment across the joint. The resulting information indicated that increasing amounts of rotation resulted in an increased percentage of correct detections. This anticipated result was not found for the displacement conditions. It was hypothesized that this unexpected result may have been caused by the counteracting effect of the Poggendorff visual illusion. The second psychophysical experiment dealt with the discrimination of rotational misalignment of scene inserts. Increasing insert size and increasing rotational misalignment produced increased detection performance. The 50% detection threshold occurring at 7 arc seconds of displacement between corresponding portions of the insert and surrounding scenes. Design tolerances based on these data are suggested. (Author)

AD-A088 442/9 PC **A03**/MF **A01**
Boston Coll Chestnut Hill MA
A Tentative Taxonomy of Human Interactive Factors in Aircraft Mishaps.
Final rept. 1 Apr-1 Mar 80,
Kenneth W. Wegner. May 80, 48p AFOSR-TR-80-0595
Grant AFOSR-79-0102

Previous research and results of the present study lend support to the concept of developing a taxonomy of factors or causes in aircraft mishaps. Twenty-five years of mishap research related to psychophysiological and environmental factors was reviewd to determine the most frequently occurring variables. Twenty-one of these were identified and classified into a tentative taxonomy under three functions: Equipment - Physical Environment, Management System, and Operator. Sixteen definitions related to these factors were available to analyze for reliability and relationship to the taxonomy functions. A survey form was developed which included the above definitions and nine selected aircraft mishap summaries. This instrument was administered to a Flight Safety Officer School class and a group of naive subjects of equivalent age and years of education. The task to be performed was to rate the presence or absence of these 'causes' in each of the mishap summaries. Data analysis performed included the computation of mean agreement rates, inter-case consistency, intercorrelations of selected variables, and comparison of mean agreement rates and judged clarity of the definitions. (Author)

PB80-221815 PC **A02**/MF **A01**
Telesensory Systems, Inc., Palo Alto, CA.
Investigation of PVF2 as a Tactile Stimulator for the Optacon.
Final rept.,
J. F. Tetzlaff. 31 Mar 80, 14p 79-4, NSF/RA-800085
Grant NSF-PFR79-18431

The main objectives of this study were to fabricate individual polyvinylidene fluoride cylindrical tactile stimulators and to place these cylinders in a small 2 x 3 array. In spite of material problems, a working Braille cell was constructed which exhibited the correct vibration levels for its elements. Cylinders 5 cm long were wound out of 30 micrometer thick material and assembled in a 2 x 3 array in the configuration of a Braille cell. Satisfactory methods were found for rolling the polyvinylidene fluoride films, etching the electrodes, and mounting and electrically bonding the cylinders. Correct electrical excitation levels were determined. Using the methods developed in this research, it should be possible to research, design and develop a polyvinylidene fluoride tactile screen which would enable one-handed operation of the Optacon. This feature would enlarge the range of tasks with which a blind person could use the Optacon, allowing higher effectiveness in a job setting.

PB80-856115 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Risk Analysis and Management. November, 1979-May, 1980 (Citations from the Energy Data Base).
Rept. for Nov 79-May 80,
William V. Sassi. Jun 80, 309p
NERACEDBNT0875
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the methods and techniques used for risk analysis, assessment, and management in business, the environment, transportation, and other potential hazards to man. (Contains 288 citations.)

5I. Personnel Selection, Training, and Evaluation

AD-A088 027/8 PC **A08**/MF **A01**
Human Sciences Research Inc McLean VA
Artillery Engagement simulation.
Final rept. for period ending Dec 79.
Exequiel R. Sevilla, Jr., and Richard J. Seed, III . May 80, 155p HSR-RR-79/24-FT, ARI-RR-1245
Contract MDA903-79-C-0266

A system was developed to integrate artillery units into engagement simulation (REALTRAIN, MILES) field training. The system involved computing the impact point of artillery rounds from the data placed on the sights of the howitzers. This allowed realistsic 'marking' of simulated missions in the vicinity of maneuver troops. During a development test, an artillery battery 'fired' 36 simulated missions. The battery improved its speed and accuracy while reducing its performance variability. Participating artillerymen were enthusiastic and felt they had learned a great deal, indicating that the system was an effective training method in itself as well as a compatible component of overall combat field training. A draft training circular designed to be used by training managers of direct support artillery battalions is being produced as a result of this project. (Author)

AD-A088 105/2 PC **A04**/MF **A01**
Naval Aerospace Medical Research Lab Pensacola FL
Airsickness During Naval Flight Officer Training: Advanced Squadron VT86-AJN.
Interim rept.,
W. Carroll Hixson, Fred E. Guedry, Jr., Garry L. Holtzman, J. Michael Lentz, and Patrick F. O'Connell. 6 May 80, 72p Rept no. NAMRL-1267

This report is the second in a series dealing with a longitudinal study of airsickness in the Basic, Advanced, and Fleet Readiness Squadrons comprising the Naval Flight Officer training program. Flight data from 1,833 hops flown by 134 VT86-AJN students being trained for various weapon operation and navigation duties in attack and antisubmarine warfare aircraft indicate that approximately 55 percent of the students reported being airsick on one or more flights, 28 percent reported vomiting on one or more flights, and 30 percent considered their flight performance to have been degraded by airsickness on one or more hops. Of the total number of hops flown, airsickness, vomiting, and performance degradation were reported to have occurred on 8.6, 3.7, and 3.4 percent, respectively, of the flights. The report details the flight data by hops and by students and also relates the airsickness performance of the student group to performance on a selected battery of motion reactivity tests administered to a large segment of the squadron population prior to beginning flight training. (Author)

AD-A088 192/0 PC **A09**/MF **A01**
George Washington Univ Washington DC Program in Logistics
The Supply of Young Craftsmen to an Industry.
Doctoral thesis,
Richard J. Claycombe. 12 Jun 80, 181p Rept no. SERIAL-T-421
Contract N00014-75-C-0729

Three models explaining the supply of young craftsmen to an industry are developed in this study. Two models pertain to the inflow of young craftsmen to an industry, in particular, the decision whether or not to participate in craft vocational education and the decision whether or not to enter a craft occupation. The third model pertains to the outflow of young craftsmen from an industry, i.e., the decision to stay in or leave their industry. Findings based on these models show, among other things, the importance of young craftsmen's current earnings and future earnings. In addition to the analytical models, descriptive data are presented which relate to the career development of young craftsmen and human capital factors that affect their productivity. (Author)

AD-A088 214/2 PC **A03**/MF **A01**
Navy Personnel Research and Development Center San Diego CA
Forecasting the Supply of Women Available to the Navy.
Final rept.,
Jules I. Borack. Aug 80, 31p Rept no. NPRDC-TR-80-31

Defense planners have given increased thought to expanding the role of women in the military. To gain insight into and obtain estimates of the relative size of the potential female and male Navy military supply pool, health examination survey data, mental aptitude data, and demographic data were analyzed. The population of females and males 17 to 24 years old was successively decremented by estimates of the population of these individuals not available for military service due to physical/medical, mental, or family status reasons. Additionally, individuals not interested in military service were deleted from the estimated supply pool. (Author)

AD-A088 313/2 PC A03/MF A01
Air Force Human Resources Lab Brooks AFB TX
Computer Generated Image: Relative Training Effectiveness of Day versus Night Visual Scenes.
Final rept.,
Elizabeth L. Martin, and Daniel F. Cataneo. Jul 80, 33p Rept no. AFHRL-TR-79-56

A transfer-of-training design was used to compare the relative training effectiveness of day and night visual scenes for the acquisition of takeoff and landing skills in the novice pilot in daylight flight conditions. Twenty-four undergraduate pilot trainees with no previous jet piloting experience were randomly assigned to one of the three treatment groups (n = 8): Day, Night, and Control. Those students assigned to the Control group received the standard syllabus of preflight and flightline instruction. The students in the two experimental groups received three sorties in the Advanced Simulator for Pilot Training (ASPT) covering instruction of takeoff, straight-in approach and landing, and straight-in approach to a touch-and-go. ASPT trained students received the same amount of training on each task with performance evaluated periodically with the ASPT's automated performance measurement system (APM), as well as with performance ratings supplied by the instructor pilot (IP). The only difference in training conditions was the use of either a day or night runway environmental visual scene. The findings of the study are as follows. (a) There were no overall differences between the Day and Night groups in their simulator performance, although there was a transitory superiority of the Day group on control of glidepath descent angle. (b) There were no differences between the Day and Night groups in their performance in the aircraft. (c) The two experimental groups performed reliably better than the Control group on the Takeoff task.

AD-A088 315/7 PC A04/MF A01
Biotechnology Inc Falls Church VA
6883 Maintenance Training Simulator Development Utilizing Imagery Techniques.
Final rept.,
James M. Goett, Theodore J. Post, and Gary G. Miller. May 80, 54p AFHRL-TR-80-3
Contract F33615-78-C-0047

This exploratory study evaluated a low fidelity, imagery-based simulation technique to determine its effectiveness in training certain avionics maintenance tasks. The technique was compared experimentally with conventional (technical order) training materials in terms of its ability to produce learning of procedural tasks. On learning tests, groups using the imagery training materials (experimental) scored significantly better than groups using the conventional materials (control) on one out of four tasks. The control groups likewise significantly outscored the experimental groups on one out of four tasks. On a delayed retention test, the scores of the experimental groups declined more than did those of the control groups (who displayed no significant loss of learning). Further tests are recommended to (a) determine optimum difficulty level for application of the technique, (b) isolate the technique's elements and evaluate them individually, and (c) investigate the individual effect on training of various components of the imagery training materials. (Author)

AD-A088 338/9 PC A06/MF A01
McBer and Co Boston MA
Army Work Environment Questionnaire (WEQ) Manual.
Research product rept.,
Murray M. Dalziel, George O. Klemp, Jr., Bernard J. Cullen, Paul J. Duffy, and Glenda Y. Nogami. May 80, 110p ARI-RP-80-1
Contracts DAHC19-78-C-0003, DAHC19-77-Q-0014

The Work Environment Questionnaire (WEQ) was designed as a measure of organizational climate that relies on description of observable aspects of the work environment rather than attitudes about work or job satisfaction. WEQ items were selected based on a critical incident analysis of work issues raised by EMs in ranks E-1 through E-9. Thirteen scales nested within four organization levels were derived based on analyses of data from infantry, artillery, armor, and support units at one installation and were cross-validated on similar units at another installation. Scale scoreswere found to be related significantly to hard outcome measures (ARTEP, IG rating, AWOL rates, and reenlistment), morale measures (operational readiness, people reporting to work unable to perform), and perceived measures (DR rate, accident rate, and miscellaneous inspection scores). The final version of the WEQ, containing 70 items, gives the OESO access to scores reflecting actual conditions as well as scores reflecting a pressure for changing those conditions. The WEQ is presented as a diagnostic and prescriptive instrument to be used by the OESO in planning an organizational effectiveness intervention. This report includes the development of the WEQ instrument; sample WEQs for enlisted and NCO, officers and civilians; instructions for WEQ administration, data coding and processing; and data interpretation. (Author)

AD-A088 348/8 PC A07/MF A01
Center for Naval Analyses Alexandria VA Marine Corps Operations Analysis Group
The Effectiveness of Information Processing in JUMPS/MMS. Volume I. Main Text and Appendices A-C.
Research contribution,
Charles A. Millard, and Patricia M. Buckley. Oct 79, 127p Rept no. CRC-404-VOL-1
Contract N00014-76-C-0746
See also Volume 2, AD-A088 349.

This research contribution is an analysis of current JUMPS/MMS performance. Reporting efficiency is examined at the base, station, group, and regimental levels and these results are compared with the past performance of JUMPS/MMS. (Author)

AD-A088 349/6 PC A13/MF A01
Center for Naval Analyses Alexandria VA Marine Corps Operations Analysis Group
The Effectiveness of Information Processing in JUMPS/MMS. Volume II. Appendices D-E.
Research contribution,
Charles A. Millard, and Patricia M. Buckley. Oct 79, 289p Rept no. CRC-404-VOL-2
Contract N00014-76-C-0746
See also Volume 1, AD-A088 348.

For abstract see AD-A088 348.

AD-A088 380/1 PC A03/MF A01
Marine Corps Washington DC
Field Services Task Analysis.
Aug 79, 47p

There are five parts to the questionnaire: Background information section; Task section; Job satisfaction/Dissatisfaction section; Write-in section; Remarks section.

AD-A088 381/9 PC A03/MF A01
Marine Corps Washington DC
Transportation Task Analysis.
Jun 79, 44p

There are five parts to the questionnaire: Background information section; Task section; Job satisfaction/dissatisfaction section; Write-in section; Remarks section.

AD-A088 382/7 PC A03/MF A01
Marine Corps Washington DC
Data Systems Task Analysis.
Aug 79, 45p

There are five parts to the questionnaire: Background information section; Task section; Job satisfaction/dissatisfaction section; Write-in section; Remarks section.

AD-A088 383/5 PC A03/MF A01
Marine Corps Washington DC
Supply Administration and Operations Task Analysis.
Sep 78, 31p

There are five parts to the questionnaire: Background information section; Task section; Job satisfaction/dissatisfaction section; Write-in section; Remarks section.

AD-A088 384/3 PC A03/MF A01
Marine Corps Washington DC
Air Operations Task Analysis.
Aug 79, 48p

There are five parts to the questionnaire: Background information section; Task section; Job satisfaction/dissatisfaction section; Write-in section; Remarks section.

AD-A088 385/0 PC A03/MF A01
Marine Corps Washington DC
Media Services Task Analysis.
Jun 78, 30p

There are five parts to the questionnaire: Background information section; Task section; Job satisfaction/dissatisfaction section; Write-in section; Remarks section.

AD-A088 386/8 PC A03/MF A01
Marine Corps Washington DC
Occupational Fields 68 (Weather Service) and 70 (Aviation Operations) MOSs 6072, 6075, 6076, 6077, 6078, 6079 (Ground Support Equipment) Task Analysis.
Aug 79, 33p

There are five parts to the questionnaire: Background information section; Task section; Job satisfaction/dissatisfaction section; Write-in section; Remarks section.

AD-A088 387/6 PC A03/MF A01
Marine Corps Washington DC
Military Police and Corrections Task Analysis.
Aug 79, 29p

You have been selected to participate in a study on the basis of your current job assignment. The information you furnish will be of great value to the Marine Corps in future decisions on: (1) occupational field structure, (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those you perform. it is designed to determine what you do in your present job. The results of the information you provide in this questionnaire will be of benefit to you and other marines in your occupational field.

AD-A088 388/4 PC A03/MF A01
Marine Corps Washington DC
Occupational Field 66 (Avionics) Less MOS's 6682, 6683 and 6689 Task Analysis.
Apr 79, 48p

This document contains a questionnaire booklet for the United States Marine Corps Task Analysis Program. Marine Corps personnel were selected to participate in a study on the basis of their current job assignment. The information they furnish will be of Great value to the Marine Corps in future decisions on: (1) occupational field structure, (2) training, (3) classification, and (4) assignment policy.

AD-A088 389/2 MF A01
Marine Corps Washington DC
Electronics Maintenance I. Task Analysis, 5952, 5953, 5954, 5955, 5956, 5958, 5959.
Jun 79, 55p
Availability: Microfiche copies only.

This document contains a questionnaire booklet for the United States Marine Corps Task Analysis Program. Marine Corps personnel were selected to participate in a study on the basis of their current job assignment. The information they furnish will be of Great value to the Marine Corps in future decisions on: (1) occupational field structure, (2) training, (3) classification, and (4) assignment policy.

AD-A088 390/0 MF A01
Marine Corps Washington DC
Drafting, Surveying and Mapping Task Analysis.
Aug 78, 28p
Availability: Microfiche copies only.

You have been selected to participate in a study on the basis of your current job assignment. The information you furnish will be of great value to the Marine Corps in future decisions on: (1) occupa-

tional field structure, (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those you perform. It is designed to determine what you do in your present job. The results of the information you provide in this questionnaire will be of benefit to you and other marines in your occupational field. Therefore, please be as straightforward, accurate and frank as possible.

AD-A088 391/8 MF **A01**
Marine Corps Washington DC
Electronics Maintenance II Task Analysis, 5937, 5938, 5939, 5942, 5943, 5944, 5945, 5947, 5948, 5962, 5963, 5964, 5974, 5978, 5979, 5977, 5982, 5993, 5994, 2884, 2885, 2886, 2887, 2888, 2889.
Apr 79, 56p
Availability: Microfiche copies only.

This document contains a questionnaire booklet for the United States Marine Corps Task Analysis Program. Marine Corps personnel were selected to participate in a study on the basis of their current job assignment. The information they furnish will be of Great value to the Marine Corps in future decisions on: (1) occupational field structure, (2) training, (3) classification, and (4) assignment policy.

AD-A088 392/6 PC **A04**/MF **A01**
Marine Corps Washington DC
Task Analysis Questionnaire Booklet, Occupational Field 60/61.
Aug 79, 59p

This questionnaire is designed to obtain information about your military job. The questions were constructed from on-the-job observations and interviews with Marines performing duties similar to yours. To properly identify the military jobs you perform, we need your assistance. Be sure your responses relate to your present billet. Be honest, frank and accurate in your responses. All of your responses will be held in confidence. Neither you nor your unit will be marked or judged on your responses.

AD-A088 393/4 PC **A05**/MF **A01**
Marine Corps Washington DC
Personnel Services Task Analysis Questionnaire Booklet for Occupational Field 01, Personnel and Administration.
Sep 77, 81p

You have been selected to participate in a study of the basis of your current job assignment. The information you furnish will be of great value to the Marine Corps in future decisions on: (1) occupational field structure, (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those you perform. It is designed to determine what you do in your present job. The results of the information you provide in this questionnaire will be of benefit to you and other marines in your occupational field.

AD-A088 394/2 PC **A04**/MF **A01**
Marine Corps Washington DC
Military Occupational Specialties (MOS) 2111.
Sep 77, 56p

You have been selected to participate in a study of the basis of your current job assignment. The information you furnish will be of great value to the Marine Corps in future decisions on: (1) occupational field structure, (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those you perform. It is designed to determine what you do in your present job. The results of the information you provide in this questionnaire will be of benefit to you and other marines in your occupational field. Therefore, please be as straightforward, accurate and frank as possible.

AD-A088 395/9 PC **A04**/MF **A01**
Marine Corps Washington DC
Military Occupational Specialties (MOS) 3241/3253.
Sep 77, 51p

You have been selected to participate in a study of the basis of your current job assignment. The information you furnish will be of great value to the Marine Corps in future decisions on: (1) occupational field structure, (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those you perform. It is designed to determine what you do in your present job. The results of the information you provide in this questionnaire will be of benefit to you and other marines in your occupational field. Therefore, please be as straightforward, accurate and frank as possible.

AD-A088 396/7 PC **A05**/MF **A01**
Marine Corps Washington DC
Military Occupational Specialties (MOS) 1341/1349.
Sep 77, 95p

You have been selected to participate in a study of the basis of your current job assignment. The information you furnish will be of great value to the Marine Corps in future decisions on: (1) occupational field structure, (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those you perform. It is designed to determine what you do in your present job. The results of the information you provide in this questionnaire will be of benefit to you and other marines in your occupational field. Therefore, please be as straightforward, accurate and frank as possible.

AD-A088 397/5 PC **A04**/MF **A01**
Marine Corps Washington DC
Military Occupational Specialties (MOS) 2141.
Sep 77, 66p

You have been selected to participate in a study on the basis of your current job assignment. The information you furnish will be of great value to the Marine Corps in future decisions on: (1) occupational field structure, (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those you perform. It is designed to determine what you do in your present job. The results of the information you provide in this questionnaire will be of benefit to you and other marines in your occupational field, therefore, please be as straightforward, accurate and frank as possible.

AD-A088 398/3 PC **A06**/MF **A01**
Marine Corps Washington DC
Military Occupational Specialties (MOS) 2142.
Sep 77, 101p

You have been selected to participate in a study on the basis of your current job assignment. The information you furnish will be of great value to the marine corps in future decisions on: (1) occupational field structure. (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those you perform. It is designed to determine what you do in your present job.

AD-A088 399/1 PC **A05**/MF **A01**
Marine Corps Washington DC
Military Occupational Specialties (MOS) 1316/2161/3513.
Aug 79, 83p

You have been selected to participate in a study on the basis of your current job assignment. The information you furnish will be of great value to the marine corps in future decisions on: (1) occupational field structure. (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those your perform. It is designed to determine what you do in your present job.

AD-A088 400/7 MF **A01**
Marine Corps Washington DC
Military Occupational Specialties (MOS) 2131.
Sep 77, 73p
Availability: Microfiche copies only.

You have been selected to participate in a study on the basis of your current job assignment. The information you furnish will be of great value to the Marine Corps in future decisions on: (1) occupational field structure, (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those you perform. It is designed to determine what you do in your present job.

AD-A088 401/5 MF **A01**
Marine Corps Washington DC
Military Occupational Specialties (MOS) 2144.
Sep 77, 102p
Availability: Microfiche copies only.

You have been selected to participate in a study on the basis of your current job assignment. The information you furnish will be of great value to the Marine Corps in future decisions on: (1) occupational field structure. (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those you perform. It is designed to determine what you do in your present job. (Author)

AD-A088 402/3 PC **A04**/MF **A01**
Marine Corps Washington DC
Military Occupational Specialties (MOS) 2151.
Sep 77, 61p

You have been selected to participate in a study on the basis of your current job assignment. The information you furnish will be of great value to the marine corps in future decisions on: (1) occupational field structure. (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those you perform. It is designed to determine what you do in your present job. (Author)

AD-A088 403/1 PC **A05**/MF **A01**
Marine Corps Washington DC
Military Occupational Specialties (MOS) 2171.
Sep 77, 77p

You have been selected to participate in a study on the basis of your current job assignment. The information you furnish will be of great value to the marine corps in future decisions on: (1) occupational field structure. (2) training, (3) classification, and (4) assignment policy. This questionnaire was constructed from on-the-job observations and interviews with marines performing duties and tasks similar to those you perform. It is designed to determine what you do in your present job. The results of the information you provide in this questionnaire will be of benefit to you and other marines in your occupational field. (Author)

AD-A088 417/1 PC **A05**/MF **A01**
Human Resources Research Organization Alexandria VA
Job Aids: Descriptive Authoring Flowcharts for Phase II-Design of the Instructional Systems Development Model.
Research product rept.,
Russel E. Schulz, and Jean R. Farrell. May 80, 95p ARI-RP-80-15
Contract DAHC19-78-C-0010

The purpose of the research was to develop job aids ('How to do it' guidance) for the activities identified in the Instructional Systems Development Model (ISD, TRADOC Pamphlet 350-30). Job aids are available for each of the five phases of the ISD model - ANALYZE, DESIGN, DEVELOP, IMPLEMENT, and CONTROL. Each job aid is composed of a Descriptive Authoring Flowchart and a Job Aid Manual. This volume, covering Phase II-DESIGN, contains an Introduction to the Use of the Job Aids and the Descriptive Authoring Flowcharts for Blocks II.1 through II.4. The supplementary Job Aid Manuals for Phase II are available in a companion document. (Author)

AD-A088 449/4 PC **A21**/MF **A01**
California Univ Los Angeles Div of Vocational Education
A National Study of the Aviation Mechanics Occupation. Phase III. Curriculum & Resurvey.
Cooperative study Nov 69-Mar 70,

David Allen, and William K. Bowers. Aug 70, 484p Rept no. 5-0189
Contract OE-6-85-043

The National Study of the Aviation Mechanics Occupation had three distinct phases: Phase 1 identified a common core curriculum for the training of aviation mechanics; Phase 2 identified, through experimental research, ways to implement the common core curriculum utilizing current instructional techniques; Phase 3 had two parts, Part One involved 100 teachers from throughout the United States in curriculum development and in teacher training; and Part Two resurveyed 30 percent of the original companies studied in Phase 1. The resurvey was conducted to update the common core curriculum and to test a method by which the Federal Aviation Administration could continue to update the common core curriculum periodically with a minimum expenditure of funds. This report contains both the curriculum developed during Part One and the survey results obtained during Part Two of Phase 3 of the study. Chapters I through IV contain the results of the instructor workshop activities and Part Two (Chapter V) contains the findings of the resurvey and the recommendations of the National Advisory Committee. (Author)

AD-A088 475/9 PC **A05**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Fort Ord's Merit-Reward System: A Contingency Management Program in Basic Combat Training,
William E. Datel. 1979, 89p

Eleven years ago, Fort Ord tested, developed, and implemented a program of contingency management in Army basic combat training (BCT). The program was called the Merit-Reward System (MRS). In 1971 the United States Continental Army Command (CONARC) directed that the MRS be tested at several of the other U.S. Army Training Centers. The United States Naval Training Base at Orlando, Florida, adapted the MRS for testing with naval recruits in early 1971. At the same time, the U.S. Coast Guard Academy at New London, Connecticut, designed a program of contingency management along the lines of the MRS for training its entrants. Now, a decade later, none of the armed services uses a system of contingency management to indoctrinate and train its members. Yet, recent observations at a large Army Training Center reveal problems similar to those present a decade ago: Use of a prison psychology (i.e., one invoking fear and punishment) to shape, control, and discipline new recruits; a training environment which frequently fails to challenge and 'motivate;' faulty management of time and other resources; insufficient coordination of schedules and agendas; a disenchanted cadre who complain of excessive time demands, meddling officers, a sharp loss in status and autonomy, and a lack of available 'tools' to train, correct, and discipline their charges; and the ever-present spectre of trainee abuse.

AD-A088 520/2 PC **A04**/MF **A01**
Advanced Research Resources Organization Washington DC
Trainability of Abilities.
Final rept. 15 Mar 77-15 Mar 80,
Jerrold M. Levine. Jun 80, 53p Rept no. ARRO-3010-FR
Contract N00014-77-C-0268

The feasibility of training selected abilities so as to facilitate transfer among tasks requiring these abilities and therefore reduce training time and increase personnel flexibility was investigated. Undergraduate college students participated in several studies of from one to five days duration. Experimental subjects received extensive practice with feedback provided on a set of tasks known to require the ability of being trained. Control subjects received no practice. All subjects were tested on transfer tasks which were dissimilar to the training tasks but which had earlier been demonstrated to require for successful task performance the abilities being trained. Results indicated that training significantly enhanced one of three of the abilities as measured by a standard ability test administered before and after training. There was no evidence that performance on the transfer of tasks was affected significantly as a result of training (i.e., there was no transfer of training). (Author)

AD-A088 524/4 PC **A02**/MF **A01**
Human Engineering Lab Aberdeen Proving Ground MD
Compensatory Training for Disabled Readers: Research to Practice.
Final rept.,
Dennis F. Fisher. Jul 80, 11p Rept no. HEL-TM-13-80
Pub. in Jnl. of Learning Disabilities, v13 p134-140 1980.

No abstract available.

AD-A950 012/5 PC **A02**/MF **A01**
Army (7th) APO New York 09102
Small Unit Replacement System,
W. W. Ragland. 22 Jun 61, 7p

No abstract available.

DOE/CA-0002 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Activities of the U.S. Department of Energy in Education. Annual Status Report, FY 1979.
Apr 80, 16p

The energy-related education activities administered in FY 1979 by DOE are described: projections for FY 1980 are also given. This document provides assistance for DOE program managers who wish to use the educational process in their operations, and it provides guidance and information to educators and the general public about DOE energy-related education activities. The education activities are classified as energy information (curriculum packages, studies, workshops and forums conferences, other materials), energy skills development, institutional resource enhancement, and other activities. A chart gives the category of activity, type of audience, and type of services provided. (ERA citation 05:030835)

ED-179 209 Not available NTIS
National Center for Research in Vocational Education, Columbus, OH.
Human Resources Directories and Files in Education,
James V. Bina, and Ida Halasz-Salster. 1979, 38p INFORMATION SER-160
Grant NIE-G-78-0211
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Fifteen educational human resource directories and files--compilations of information about individuals with certain areas of expertise who can provide assistance to educators--are described in this document. Five criteria were used to determine which directories would be included: (1) lists individuals, (2) searchable by index(es), (3) available nationally, (4) readily accessible, and (5) recent and valid. Each human resource directory is summarized in a one-page description, which includes title, description, index information, date of current issue, update frequency, cost, publisher, and a sample entry. All are available for national or multi-state use by educators. State directories which are accessible to users in other states or which can serve as models for developing a human resource directory are also noted. Information for interpreting human resource directory sheets is provided, and guidelines for developing a human resource directory are outlined. A supplemental list cites education-related human resource directories that did not meet all the stipulated criteria.

HRP-0029465/2 PC **A07**/MF **A01**
Minnesota Univ., Minneapolis. School of Public Health.
Master's Degree Program in Mental Health Administration. Final Report of the First Five Years,
John R. Malban. Oct 78, 136p
Grant PHS-MH-13334

The innovative training program in mental health administration described in this report grew out of an idea sparked by rapid changes that were taking place in the mental health field. Single institutional systems were giving way to a growing array of community-based mental health services, and it was clear that the effectiveness of these new and different delivery systems would depend in large part on how well they could be fitted into a viable consumer-oriented framework. Administrators with the necessary skills to tackle the job, however, were in short suppiy. As a step toward swelling their ranks, and experimental two-year Master's degree Program in Mental Health Administration was launched in 1973 at the University of Minnesota as an integral part of the Program in Hospital and Health Care Administration, School of Public Health. The Program was funded for five years by a grant from the Experimental and Special Training Branch of the National Institute of Mental Health. It was co-sponsored for that period of time by the Department of Psychiatry, School of Medicine. This report covers the first five years of experience with the Program.

HRP-0031192/8 PC **A08**/MF **A01**
Florida State Univ., Tallahassee.
Health Education Assessment Survey: The Florida Panhandle, December 1978,
W. Scott Ford, and Ann S. Ford. Aug 79, 164p
Contract PHS-200-76-0637

Surveys of households and physician attitudes toward the health education resource center (HERC) in the Florida Panhandle were conducted. The HERC was established as a private nonprofit corporation to raise the health status of residents to the Florida Panhandle by improving the region's consumer health education programs. The main objective of the household survey was to describe the status of health knowledge, attitudes, practices, and health levels prevalent in the population. The primary objective of the primary care physician survey was to ascertain the extent and type of health education provided for the area's physicians and to determine how receptive these physicians would be to working with the HERC. Household data were collected by a multistage area probability sample design. Survey forms were completed for 319 households or 53 percent of the eligible sample. The sample for the physician survey included all practicing primary care physicians in the 18-county area. Of 230 physicians, 103 or 45 percent returned completed questionnaires. Based on survey data, program areas for detailed consideration by the HERC are suggested: reducing the incidence of hypertension uncontrolled hypertension; reducing excess nervousness and chronic anxiety; home health care programs for the chronically ill; nutrition counseling; increased use of breast self-examination; increased use of auto restraint devices; and monitoring of immunization levels for major contagious diseases. Survey findings with important implications for the HERC are highlighted. Findings for the household survey and the physician survey are compared and contrasted with regard to the effectiveness of consumer education, health knowledge, health-related attitudes, and health practices. Supporting data are provided, and survey forms are appended.

HRP-0902073/6 PC **A06**/MF **A01**
National Environmental Health Association, Denver, CO.
Curriculum Guideline for Environmental Health.
Rept. for 22 Jun 78-22 Apr 79,
Lawrence J. Krone, Karl L. Ford, Linda S. Worrell, and Florence M. Kent. 12 Nov 79, 105p
Contract PHS-HRA-231-77-0030

This Curriculum Guide is intended to be a reference tool only and is not intended to be a prescription for academic institutions. With the rapid growth of environmental health curricula around the country, it is believed that a curriculum reference tool would be a helpful aid to institutions establishing or revising their curriculum. The Curriculum Guide is intended to serve as a competency based resource document for environmental health curricula. Competencies are derived from practitioner functions and major responsibilities that have been defined in the Role Delineation Instrument. The Curriculum Guide is a map of a broad-based, multi-disciplinary curriculum building on the basic physical and natural sciences. The document is not a prescription but rather a reference tool for educators and trainers in environmental health.

HRP-0902384/7 PC A22/MF A01
Carkhuff Inst. of Human Technology, Amherst, MA.
Communication Skills for Health Professions Faculty.
Final rept. 28 Sep 78-31 Mar 80.
1980, 506p
Contract PHS-HRA-232-78-0178

The working objectives were to increase the participants' awareness, knowledge and acquisition of communication skills related to clinical teaching. The skills taught were aimed at establishing collaborative relationships with students in the clinic.

JINR-10-10951 PC A02/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
"KADRY" System Software.
N. N. Govorun, A. V. Gusev, N. S. Zaikin, Yu. P. Zalatoryus, and S. G. Kadantsev. 1977, 13p
In Russian.
U.S. Sales Only.

The KADRY automated information system, designed for the use in the JINR personnel account subsystem, arries out three functions: data base initial copy creation, data base renovation, and information presentation. Computation process organization scheme as well as a brief discription of program modules and specialized library of standard programs of the KADRY system have been given. (Atomindex citation 10:421689)

PB80-222847 PC A04/MF A01
Western Illinois Univ., Macomb. Dept. of Economics.
Compensating Differentials and Liability Rules. Who Pays for Workers' Compensation.
Final rept. Oct 79-Sep 80,
Stuart Dorsey, and Norman Walzer. 1 Sep 80, 61p DLMA-71-17-79-36-1
Grant DL-91-17-79-36

The competitive prediction that workers in hazardous jobs will receive wage premiums is based upon the implicit assumption that workers are liable for the costs of their own injuries. It was demonstrated that previous estimates of compensating wage-risk differentials likely are downward biased due to the failure to control for variations in employer liability across states. The estimate of the risk premium for nonunion employees increased significantly when a measure of employers' workers' compensation costs was introduced. It also confirmed another prediction of the competitive model--that increased employer liability for occupational risk precipitates offsetting wage reductions. Thus it appears that in the nonunion sector the cost of workers' compensation is borne almost entirely by employees.

PB80-223118 PC A09/MF A01
Barsby (Steve L.), Arlington, VA.
Private Supplementary Income Programs: A Workable Supplement to Unemployment Insurance (UI).
Final rept. Sep 78-May 79,
Steve L. Barsby, and Howard R. Bloch. Jul 80, 176p ASPER/PUR-78/4788/A
Prepared in cooperation with George Mason Univ., Fairfax, VA. Dept. of Economics.

The objective of this study is to examine the funding and benefit provisions of the major supplementary unemployment benefit (SUB) plans as negotiated in the auto, steel, aluminum, can, agricultural implement, rubber and cement industries. The major forces which shaped the provisions of these plans are tracked and suggestions are made for the success of SUBs in some industries but not in others. A range of plans which provide benefits through individual worker accounts are summarized. Funding and benefit provisions of privately negotiated layoff plans were obtained by examining successive labor agreements between unions and employers. Operating experience data are from files of cooperating firms and unions.

PB80-223811 PC A14/MF A01
Office of Education, Washington, DC.
Higher Education and the United States Office of Education (1867-1953).
Richard Wayne Lykes. 1975, 305p

The report is a history of the evolution of the interest of the National Government in higher education. It gives a chronological account of the Office of Education, and describes the persons involved in its development.

PB80-224900 PC A03/MF A01
Minimum Wage Study Commission, Washington, DC.
Transcript of Minimum Wage Study Commission Meeting on September 8, 1980.
8 Sep 80, 29p

The report is a transcript of the hearings on the effects of a minimum wage on employment and unemployment, particularly of teenagers.

PB80-227333 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
Life-Cycle Changes in Household Structure and Travel Characteristics,
J. D. Downes. c1980, 32p TRRL-LR-930
Also pub. as ISSN-0305-1293.

The report discusses the deliberate use of the same households in surveys separated by time after this condition was accidentally met. Useful results may be obtained comparing households and travel patterns.

PB80-227937 PC A02/MF A01
Transport and Road Research Lab., Crowthorne (England).
Observations of Routes Chosen and Instruction Given during Driving Lessons,
A. J. Downing, J. A. Fazakerley, and D. Sheppard. c1980, 21p TRRL-SUPPLEMENTARY-549

The report reviews the subjects covered by instructors during driving lessons. They include safety precautions, routes, and urban driving.

PB80-853591 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Incentive Plans. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 195p
NERACUSGNT0622
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory, design and applications of employee incentive programs. Also included are discussions on the benefits of such incentive plans for cost containment, improving the quality of work life and the improvement of production. (Contains 164 citations.)

PB80-855513 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Computer Aided Education. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 96p NERACEI NT0543
Sponsored in part by National Technical Information Service, Springfield, VA.

These abstracts cover the use and application of computers, microprocessors and ancillary software for instruction/education purposes in such disciplines as agriculture, medicine and engineering at both undergraduate and graduate college levels. There are also abstracts dealing with computer aided instruction (CAI) for the deaf and hearing impaired. (Contains 112 citations.)

PB80-856319 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Human Resource Development. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 109p
NERACUSGNT0628
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the development of human resources for military, governmental, and other community oriented purposes. (Contains 084 citations.)

PB80-927909 PC E08/MF A01
Central Intelligence Agency, Washington, DC.
Directory of Officials of the Socialist Republic of Romania; a Reference Aid.
Aug 80, 197p CR-80-13258
Supersedes NTISUB/E/279-011.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-927900.

The directory is a functional reference guide to officials of the Romanian Government, the Romanian Communist Party, and other prominent public organizations.

PB80-927910 PC E02
Central Intelligence Agency, Washington, DC.
Cuban Leadership; a Reference Aid.
Wall chart.
Sep 80, 22p CR-80-11711
Supersedes NTISUB/E/279-015.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-927900.

The wallchart depicts the hierarchy of leading Cuban officials. It shows, in particular, the interlocking relationships in the Cuban power structure.

SHR-0003232 PC A04/MF A01
Virginia Community Education Advisory Committee, Richmond.
Virginia Community Education Study Report.
26 Sep 78, 53p
Unclassified report

Community education programs in Virginia reflect the Commonwealth's diversity in both population and geography. Most projects involve expanced use of public facilities (usually school buildings), some cooperative involvement among community agencies and organizations, and some degree of citizen involvement. A survey of citizen attitudes toward community education was conducted by mailing questionnaires to county supervisors, city council members, school board members, and PTA presidents. The four groups differed significantly. The PTA presidents were most likely to favor interagency cooperation, after hours used of school facilities, broadening based community planning, and citizen participation.

SHR-0003252 PC A07/MF A01
Michigan Univ., Ann Arbor. Rehabilitation Research Inst.
Competency Evaluation in Rehabilitation (CEIR): Rehabilitation Counseling Competencies. Series 1, Monograph III. Michigan Studies in Rehabilitation.
Don K. Harrison, Chia Chih Lee, and Mary Ann Zawada. 1978, 138p
Grant SRS-15-58021
See also related documents, SHR-0002754; SHR-0003253 -- SHR-0003255. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003252/ES.

In this University of Michigan study, 48 experienced vocational rehabilitation counselors judged 90 competencies proposed as goals for a Master's Degree program in rehabilitation counseling. The study is intended primarily for rehabilitation counseling educators. Categories of the tasks, or competencies, include philosophy of rehabilitation, human behavior, community resources for rehabilitation, counseling process, medical aspects of disability, professional advocacy, client assessment, use of research, job analysis / placement / jobs restructuring, and management and vocational rehabilitation services supervision. The 17 women and 31 men participating had at least a year's experience in rehabilitation counseling; 88 percent had academic degrees at the Master's level or

above, and most had a concentration in rehabilitation counseling. All were to answer 5 questions for each of the 90 competencies regarding their relevance to the rehabilitation counselor's job; satisfaction when used on the job; pertinency to a majority of clients; necessary preparation; and staff needing to perform the task. Major findings include the following: (1) great importance was ascribed to the counseling process, client assessment, medical aspects of disability, human behavior, case management, and job analysis / placement / restructuring; (2) participants expressed greatest enthusiasm for tasks in client - counselor interaction, least for use of research and management; (3) practically all of the proposed competencies were deemed useful for over half of rehabilitation clients; (4) participants felt some graduate study was required for proficiency in most competencies; (5) performing most tasks was considered useful for other rehabilitation personnel. A bibliography is included, and appendices contain complete lists of the 90 competencies and their ratings by the participating counselors.

5J. Psychology (Individual and Group Behavior)

AD-A087 979/1 PC **A02**/MF **A01**
Human Engineering Lab Aberdeen Proving Ground MD
Perceived Control. A Generalized State of Motivation.
Final rept.,
Lawrence C. Perlmuter, Karelle Scharff, Robert Karsh, and Richard A. Monty. 1980, 15p HEL-TM-11-80, ARO-14296.5-L
Pub. in Motivation and Emotion, v4 n1 p35-45 1980.

No abstract available.

AD-A088 000/5 PC **A03**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Adaptive Mental Testing: The State of the Art.
Technical rept.,
James R. McBride. Nov 79, 47p Rept no. ARI-TR-423

This paper defines adaptive mental testing in relation to conventional mental testing, outlines the major research issues in adaptive mental testing, and reviews the state of the art for each of the research issues. The research issues are: (1) psychometric theory; (2) design of adaptive tests; (3) scoring adaptive tests; (4) the testing medium; (5) item pool development; and (6) advances in measurement technology. (Author)

AD-A088 139/1 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Psychology
Memory Load and Event Rate Control Sensitivity Decrements in Sustained Attention.
Technical rept.,
Raja Parasuraman. 21 Jan 79, 6p Rept no. TR-26
Contract N00014-76-C-0616
Pub. in Science, v205 n4409 p924-927, 31 Aug 79.

No abstract available.

AD-A088 193/8 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Psychology
Cerebral Organization of Event Related Potentials Analyzed by Multidimensional Scaling Techniques.
Technical rept.,
Jackson Beatty. 1 Feb 80, 3p Rept no. TR-24
Contract N00014-76-C-0616
Pub. in NATO Conference Series, Series III: Human Factors, v9 p446.

No abstract available.

AD-A088 267/0 PC **A04**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Abstracts of ARI Research Publications, FY 1977.
Technical rept.,
Apr 80, 53p Rept no. ARI-TR-456

Abstracts and bibliographic citations, including the Defense Technical Information Center (DTIC) accession number, are given for 28 Research Reports, Technical Papers, Utilization Reports, and Technical Reports published by the Army Research Institute (ARI) during Fiscal Year 1977. To complete the record of research accomplished by ARI in FY 77, abstracts or descriptions are included of 35 intra-agency Research Problem Reviews and Research Memorandums. All items are indexed by author and corporate author and by research area. The Federal depository libraries where the published reports may be obtained are also listed. (Author)

AD-A088 339/7 PC **A06**/MF **A01**
Applied Psychological Services Inc Wayne PA Science Center
Human Performance in Continuous Operations. Volume III. Technical Documentation.
Technical rept. Jan-Sep 79,
Arthur I. Siegel, Mark G. Pfeiffer, Felix Kopstein, J. Jay Wolf, and Halim Ozkaptan. Mar 80, 124p ARI-RP-80-4C
Contract DAHC19-77-C-0054
See also Volume 1, AD-A086 131.

This is the third volume of a series dealing with human performance in continuous operations. This volume documents the technical procedures used to analyze adverse effects and to project diminished human performance capabilities during continuous operations, as described in Volumes I and II of this series. Specifically, the present volume (Volume III of the set): (1) depicts the technical aspects of the development of the prior two volumes, (2) updates a prior survey of the literature concerning the effects of continuous operations on military performance, (3) describes the methods for deriving 'critical' tasks included in Volume I, (4) describes the details of the mathematical procedures employed in Volume I to calculate and compound projected performance effectiveness, and (5) describes the details of a computer simulation model, which incorporates human effects, for simulating human performance in continuous operations. (Author)

AD-A088 454/4 PC **A02**/MF **A01**
Rutgers - the State Univ New Brunswick NJ Dept of Psychology
Foraging Cost and Meal Patterns in Ferrets,
Lynn W. Kaufman. 3 Mar 80, 4p
Grant PHS-HD-10588
Pub. in Physiology and Behavior, v25 p139-141 1980.

No abstract available.

AD-A088 455/1 PC **A02**/MF **A01**
Rutgers - the State Univ New Brunswick NJ Dept of Psychology
Meal Cost and Meal Patterns in an Uncaged Domestic Cat,
Lynn W. Kaufman, George Collier, Wendy L. Hill, and Kathy Collins. 3 Dec 79, 5p
Grant PHS-HD-10588
Pub. in Physiology and Behavior, v25 p135-137 1980.

No abstract available.

AD-A088 471/8 PC **A07**/MF **A01**
Colorado Univ At Boulder Center for Research on Judgment and Policy
The Integration of Research in Judgment and Decision Theory.
Technical rept.,
Kenneth R. Hammond. Jul 80, 132p Rept no. CRJP-226
Contract N00014-77-C-0336

The five major premises of the Cognitive Continuum Theory of judgment and decision making are described and the potential power of the theory to encompass and to unify the work in the field of judgment and decision making is indicated. Because the theory is anchored in the concepts of intuitive and analytical cognition the recent treatment of these topics is described in terms of (a) the positive view, in which intuitive cognition is praised for its special capabilities to accomplish what analysis cannot, and (b) in terms of the negative view, in which intuitive cognition is denigrated for its failures, 'shortcomings and distortions'; in short, for its inability to accomplish what analysis can. In contrast to both views, the Cognitive Continuum Theory puts forth a 'comprehensive view'; it provides a means for encompassing cognitive tasks, cognitive activities and their behavioral and adaptive consequencies over the full range of cognition. . This leads to the examination of the various properties of the many different cognitive tasks that are encountered by contemporary human beings, as well as examining the properties of the cognitive activities induced by such tasks and the judgment and decision making behavior that follows. Various properties of cognitive tasks are therefore listed, the various properties of cognitive activities that are associated with these task properties are indicated, and predictionsare made regarding the behavior that follows from various cognitive activities.

AD-A088 517/8 PC **A04**/MF **A01**
Colorado Univ At Boulder Center for Research on Judgment and Policy
The Concept of Weight in Judgment and Decision Making: A Review and Some Unifying Proposals.
Technical rept.,
James Shanteau. Jul 80, 65p Rept no. CRJP-228
Contract N00014-77-C-0336

The concept of weight or importance is central to analyses of judgment and decision making. However, different theoretical approaches disagree about the interpretation and operational definition of weight. The purpose of this paper is: (1) to review the various approaches to judgment and decision making, and to consider how each defines weight, (2) to summarize some of the variables that can influence the weight estimates of each approach, (3) to propose a simplifying and hopefully unifying definition of weight, (4) to explore some of the consequences and predictions of this new approach, and (5) to make some suggestions for both language revision and future research which would aid in the development of the weight concept. (Author)

AD-A950 013/3 PC **A04**/MF **A01**
Illinois Univ At Urbana-Champaign Group Effectiveness Research Lab
The Effects of Experimentally Modified Interpersonal Perceptions on Social Behavior and Adjustment, and A Factor Analytic Examination of Some Dimensions of Interpersonal Perception.
Interim technical rept. nos. 9 and 10,
Sheldon Alexander, Alan R. Bass, Eugene H. Drucker, and Fred E. Fiedler. Dec 60, 57p
Contract DA-49-193-MD-2060

No abstract available.

AD-A950 014/1 PC **A05**/MF **A01**
Maryland Univ Baltimore School of Medicine
Systematic Operations in Solving Concept Problems.
Technical rept.,
Murray Glanzer, Janellen Huttenlocher, and William H. Clark. Aug 62, 95p
Contract DA-49-007-MD-1004

No abstract available.

ED-179 212 Not available NTIS
Michigan State Univ., East Lansing. Inst. for Research on Teaching.
The Inquiry Theory: An Information-Processing Approach to Clinical Problem-Solving Research and Application.
Research series No. 1,
John F. Vinsonhaler. Jan 78, 30p
Contract NIE-400-76-0073
Available from ERIC document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Institute for Research on Teaching, Coll. of Education, Michigan State Univ., 252 Erickson Hall, East Lansing, MI. 48824 ($2.00).

This paper is a distillation of research findings on clinical problem-solving over the past decade. These findings are summarized by means of three basic concepts which describe a rudimentary

theory of clinical problem-solving performance and instruction: (1) the principle of case simulation--valid clinical problem-solving behavior can be induced by simulated cases presented to clinicians; (2) the principle of clinical simulation--the problem-solving behavior of clinicians is probabilistically dependent on clinical memory, clinical strategies, and the case; (3) the performance evaluation and instructional corollaries of the Inquiry Theory--clinical problem-solving performance can be measured and improved by providing external aids to clinical memory or strategy, training aids for them, and combinations of both. Discussed in the paper are reported findings associated with these three basic concepts and the set of computer programs (The Basic Management Information System) developed by the authors and fellow researchers in studies of the Inquiry Theory. A bibliography is included.

PB80-226137 PC **A04/MF A01**
California State Dept. of Motor Vehicles, Sacramento.
Suspension and Revocation Effects on the DUI Offender.
Final rept.,
Roger E. Hagen, Edward J. McConnell, and Rickey L. Williams. Jul 80, 62p CAL-DMV-RSS-80-75

Past studies have demonstrated that license suspension or revocation reduces subsequent DUI offenders to a greater degree than jail sentences and fines alone, or participation in an alternative alcohol abuse treatment program. While previous studies have shown that driving during the term of suspension or revocation is not an uncommon occurrence, the nature of the impact of licensing action upon the driver has not been documented to any great degree. The scope of the study reported includes three objectives: (1) to assess the ability of first, second, and third DUI offenders to avoid future DUI convictions or traffic accidents; (2) to survey drivers being reinstated following a DUI suspension or revocation in order to gather information concerning admission of driving during the action, transportation alternatives used while under the licensing action, and reactions of the driver to both the action and the changes in life style which resulted thereby; and (3) to assess the incidence of driving while under licensing action, as reported by drivers themselves, and by the presence of any driver record update. In addition to the results, major program recommendations concerning the first offender and the use of restricted licenses are outlined.

PB80-227028 PC **A02/MF A01**
Transport and Road Research Lab., Crowthorne (England).
A Study of a Road Safety Film for Children,
Averil McGarvie, R. F. Davies, and Elizabeth J. Sheppard. c1980, 20p TRRL-SUPPLEMENTARY-578

The report describes the reactions of a group of school children to a film which illustrates points of traffic safety.

SHR-0003688 PC **A05/MF A01**
Department of Health, Education, and Welfare, New York. Region II.
Welfare Reform. Final National Summary Report on Regional Outreach.
15 Apr 77, 81p

DHEW's regional offices conducted a national welfare reform outreach effort in 1977, gathering the views of over 10,000 individuals and organizations, conducting 145 conferences and public meetings in all States, and reaching many people through 300 newspaper articles and radio and television interviews. These statements provide insights into the grassroots impact of the welfare system and suggestions as to what can be done to improve the system. Comments on the following major issues are discussed: (1) coverage and benefit levels; (2) relationship between the income maintenance system and the labor force; (3) roles for the Federal, State, and local governments; (4) impact of the welfare system on the family, (5) relationship between welfare and social services; (6) administration and management; and (7) special circumstances involving treatment of the Commonwealth of Puerto Rico and the United States Territories. Overall, it was found that the welfare system needs to be changed, but no consensus was reached concerning how to change it. However, the following recommendations received strong, widespread support: an adequate assistance level, with a national minimum as a base; easily understandable and unform eligibility rules; meaningful jobs for recipients; mechanisms that will implement the work ethic; coverage for families on the basis of need, without regard to status or present number of parents in the family unit; an end to fragmentation which shifts people from program to program; elimination of punitive or demeaning practices; and development of a system which can be administered with integrity, efficiency, and compassion. Tabular data refer to the number of people who were solicited for their comments through media contacts, by mail, or in group meetings.

5K. Sociology

HRP-0031186/0 PC **A02/MF A01**
Illinois Univ. at Chicago Circle.
Special Needs Consumption of the Low Income Disabled,
Nancy R. Mudrick, and William G. Johnson. Oct 78, 24p
Grant NSF-APR76-24651
Prepared in cooperation with Syracuse Univ., NY. Paper presented in the Social Work section at the American Public Health Association Annual Meeting, held at Los Angeles, California on October 1978. Revised version of document titled 'Special Needs Consumption of the Low Income Disabled'.

The focus of this paper is the utilization of special services and the source of payment for such services among non-institutionalized low income disabled persons. The utilization of services and special need items for the basic consumption of the disabled. The source of payment for these items is studied because it affects the utilization rate as well as the impact of special needs on the household budget. Utilization and source of payment for special needs are both indicators of the extent of additional basic living costs among the disabled.

LA-8284-MS PC **A06/MF A01**
Los Alamos Scientific Lab., NM.
Rural Migration in the Western States.
J. G. Freiwald, B. R. Poster, C. Olinger, P. C. Aragon, and P. L. Buslee. May 80, 102p
Contract W-7405-ENG-36

The rapid rural growth rate since 1970 in 14 western states (Arizona, Colorado, Kansas, Idaho, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming) was stimulated by recreation, resource development, manufacturing, commuting, institutional employment, and retirement. The eight Rocky Mountain States had significantly greater rural growth than the six Great Plains States. Other factors correlated with in-migration are population growth during the 1960's, presence of an interstate highway, adjacency to a metropolitan area, high per capita income, high population density, and absence of rural farm population. The presence of a central city with a population of over 20,000 or of a military base does not appear to be significantly related to net in-migration. An overview of regional growth patterns and of the factors related to rural in-migration is included, followed by an examination of these factors for each of the counties that experienced high in-migration in the 14 states. (ERA citation 05:029635)

LBL-10323 PC **A02/MF A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Standardization of Age-Adjusted Mortality Rates.
S. Selvin, S. T. Sacks, and D. W. Merrill. Feb 80, 13p
Contract W-7405-ENG-48

Because age is a significant variable in the occurrence and frequency of human disease, any comparison of disease or mortality rates, to be useful, must be age-specific or age-adjusted. Age-specific comparisons are not always appropriate or possible, however. A common method of eliminating the influence of age in comparing mortality rates from one community to another is to employ statistical methods of age-adjustment. While a variety of methods will accomplish this task, most are weighted averages of the age-specific rates. Two widely used adjustment procedures are direct and indirect age-adjustment. (ERA citation 05:031170)

PB80-214802 PC **A02/MF A01**
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
How Well are We Housed. 6. Large Households,
Ruth Limmer. May 80, 23p HUD-0001531
See also Part 5, PB80-173461.

The report discusses the inadequacies in the housing of large families in the U.S. and is part of a series on the housing conditions of various groups. The large household, composed of six or more people, decreased from 10.7 percent of the total households in the country in 1970 to only 7.1 percent in 1976. The report shows household flaws for plumbing, kitchen, sewage, heating, maintenance, public hall, toilet access, and electrical service. Maintenance is the leading flaw, followed by toilet access and plumbing. For large black household units, 30.6 percent had flaws, while 23.5 percent of the Hispanic households and only 12 percent of the white households had flaws. Although the rate of flawed housing for the entire Nation is 10 percent, it is 17 percent for large households. The likelihood of being inadequately housed is greatest in the rural west and in the New York City area and smallest in the north central region. If a poor white man is the head of a large household, his chances of living in inadequate housing are one in five, while it is one in three for a white woman or Hispanic person of either sex and greater than one in three for a black of either sex. A rural black's chances are greater than one in two. Nearly 87 percent of owner households can afford adequate housing for 25 percent of their income, while only 63 percent of renter households can rent adequate housing. Charts, tables, and photographs are included.

PB80-214828 PC **A15/MF A01**
Harvard-MIT Joint Center for Urban Studies, Cambridge, MA.
Equal Credit Opportunity: Accessibility to Mortgage Funds by Women and by Minorities. Volume I.
Technical rept. (Final),
Robert Schafer, and Helen F. Ladd. May 80, 331p HUD-0001573
Contract HUD-H-2879
See also PB80-206626 and Volume II, PB80-214836.

The project report of an investigation of discrimination by mortgage lenders in California and New York reveals little discrimination against women but widespread discrimination against minorities. The study is posited upon Federal and State statues which make it illegal for banking institutions to discriminate in the granting of mortgage loans on the basis of certain characteristics of the borrower such as race, sex, or marital status. They also forbid discrimination on the basis of certain property characteristics. The study empirically examines mortgage application data from both States to determine the extent to which urban mortgage lenders discriminate on the basis of prohibited borrower characteristics and the extent to which allegations by anti-redlining groups are valid. The focus of the study is on the lender's decision to lend rather than on the aggregate volume of lending by geographical area. The models presented analyze three issues: appraisal practices; decisions to approve, modify, or deny a mortgage application; and mortgage credit terms. Multivariate statistical analysis determines the impact of the discrimination variables on the probability that a loan will be denied or modified. Lending decisions are analyzed by considering outcomes to a loan application; by analyzing the conditions under which mortgage credit is extended; and by reviewing information on mortgage applications that are denied.

PB80-214836 PC **A12/MF A01**
Harvard-MIT Joint Center for Urban Studies, Cambridge, MA.

Equal Credit Opportunity: Accessibility to Mortgage Funds by Women and by Minorities. Volume II.
Technical rept. (Final),
Robert Schafer, and Helen F. Ladd. May 80,
267p HUD-0001574
Contract HUD-H-2879
See also Volume I, PB80-214828.

The second volume of a study of discrimination by mortgage lenders in California and New York contains appendices that supplement information given in the first volume of the study. Appendix A defines the variables used in the analysis, including financial and neighborhood characteristics, the racial composition of neighborhoods, and sex and marital status of mortgagers. Appendix B contains model estimates for California savings and loan associations. Multinomial logit estimates of actions on applications for conventional mortgages on owner-occupied single family houses are given for the following areas: Anaheim-Santa Ana-Garden Grove, Bakersfield, Fresno, Los Angeles-Long Beach, City of Los Angeles, Modesto, Oxnard-Ventura, Sacramento, Salinas-Monterey, San Bernardino-Riverside-Ontario, San Diego, San Francisco-Oakland, San Jose, Santa Barbara, Santa Rosa, Stockton, Vallejo-Napa. Appendix C contains model estimates for New York. Multinomial logit estimates of actions by commercial banks on applications of conventional mortgage loans on owner-occupied 1-family to 4-family houses are included for Albany, Schenectady, Troy, Rochester, Syracuse, New York, and Nassau-Suffolk.

PB80-214893 PC **A08**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
Exploring New Strategies for Improving Public Housing Management,
Robert Kolodny. Jul 79, 168p HUD-0001617

The booklet discusses a program of research and demonstration in the management of public housing. Federal and local levels have not kept up with the changes in the program's goals and the environment in which public housing operates. Agencies have paid insufficient attention to the process of changing organizational practice through an overemphasis on improved management products. There has also been an inadequate provision for onsite technical assistance and a lack of well-documented success. Most public housing authorities will need information on good technical practices in housing management along with help in the process of institutionalizing them. The agenda for HUD to improve individual authority performance includes intervention, technical assistance, training, dissemination, and transfer over basic research and long-term evaluation. The three approaches to direct participation and experimentation at troubled sites are process research, product research, and long-term research. Research should encompass detailed studies of successful innovation, identification of effective management practice, and studies of successful efforts to assimilate large low-income families into public housing data base, studying similarities in the problems of public housing and those of multifamily subsidized programs, examining the place of public housing in neighborhood revitalization, and studying the future role of public housing authorities. Tables, footnotes, and a bibliography of 170 items are included.

PB80-214919 PC **A10**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
Gautreaux Housing Demonstration: An Evaluation of Its Impact on Participating Households,
Kathleen A. Peroff, Cloteal L. Davis, Ronald Jones, Richard T. Curtin, and Robert W. Marans. Dec 79, 219p HUD/PDR-558, HUD-0001619

The report evaluates the impact of the Gautreaux housing demonstration on participating families. Gautreaux, the result of a series of court actions, was a Federal effort to explore ways of providing metropolitan wide housing opportunities through the use of the Section B Housing Assistance Payments Program. Its origin was a suit brought in 1966 by public housing tenants in Chicago, Ill., against the Chicago Housing Authority and HUD. Tenants charged that these agencies had practiced racially discriminatory policies. The demonstration makes it possible for a small number of tenants in and applicants for public housing to move to neighborhoods around the city with small percentages of minority residents. In the 3 years the demonstration has been operating, 455 families have been placed, primarily in suburban areas with 30 percent or fewer minority residents. The data collected from housing market, demographic, and personal interviews suggest a tightening in the number of housing units available for rents since the early stages of the demonstration and an unwillingness of some participants to move to the suburbs where most of the housing was located.

PB80-215551 PC **A10**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Proceedings of the National Outdoor Recreation Trends Symposium (1980) Held at Durham, New Hampshire on April 20-23, 1980. Volume II.
Forest Service general technical rept. (Final),
Wilbur LaPage. 1980, 219p NEFES/80-105, FSGTR-NE-57
See also Volume 1, PB80-177884. Sponsored in part by Heritage, Conservation and Recreation Service, Washington, DC.

Volume 2 includes papers on industry sources of trend data, applied trend research, the use of trend data for planning, and trend measurement.

PB80-216047 PC **A12**/MF **A01**
CONSAD Research Corp., Pittsburgh, PA.
Methodolgy for the Evaluation of the Urban Technology System,
Samuel I. Doctors, Lawrence Lerer, Patricia Newbold, Steve Director, and Alice Lange. Nov 79, 267p NSF/RA-800109
Grant NSF-ISP78-827101

The report presents an overview of the evaluation methodology for the Urban Technology System (UTS) together with specific descriptions of nine evaluation sub-studies. UTS seeks to promote technological innovation in cities and urban counties with populations of 50,000-500,000, and case studies of innovations in participating and non-participating sites. The evaluation methodology has several objectives: (1) to assess to what extent, how, and why the original objectives of the UTS system were achieved; (2) to provide policy-relevant information to a variety of audiences to help them decide whether or not to participate in, or otherwise support, the UTS or similar systems; and (3) to provide information to existing UTS participants to help them strengthen their operations. Also discussed are the organization of the study, sources for evaluation data, products of evaluation, and resource requirement and scheduling. Nine sub-studies are described: effects of UTS on the amount of innovation in local government; additional analysis of the UTS site innovations; the roles of technology agents, back-up sites, and participating governments in the implementation of UTS; key variables affecting the operation of UTS; case studies of the innovation process; diffusion of innovations by UTS and control sites; assessment of the UTS communications network; market aggregation and private sector R & D effects; and effects of UTS on public sector R & D.

PB80-216344 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Domestic Food Programs: An Overview,
Kathryn Longen. Aug 80, 36p ESCS-81

Federal spending in nine major U.S. Department of Agriculture food assistance programs rose from $1.06 billion in fiscal year 1969 to nearly $10.6 billion in fiscal year 1979. This reflected the development of new programs, increased participation in existing programs, and higher benefit payments in response to rising food prices. Changing agricultural and economic conditions are among the causes that have shifted the form in which benefits are provided away from food distribution toward cash or voucher payment.

PB80-218670 PC **A09**/MF **A01**
National Park Service, Tucson, AZ. Western Archeological Center.
Reward Mine and Associated Sites: Historical Archeology on the Papago Reservation.
Final rept.,
George A. Teague. Aug 80, 195p NPS/WAC-80-08, WAC/ANTHROPOLOGY-11

This report gives details of excavation, mapping, surface collection, and recording at Reward Mine, another small mining camp called Site 44, and a Papago Indian camp called Site 19. All sites were occupied during the period ca. AD 1885-1915. Present-day remains at these sites include building ruins, parts of machinery, trash dumps, mine shafts, and tailings. Reward Mine and Site 44 were copper mines with associated Euro-American labor camps. Site 19 is the remains of an Indian camp; residents at the site may have worked at Reward Mine. Research focused on reconstruction of past industrial processes, interpretation of domestic life at the camps, understanding of site planning and foodways, and learning about group composition and interactions.

PB80-218688 PC **A02**/MF **A01**
North Dakota Univ., Grand Forks. Dept. of Anthropology and Archaeology.
Cultural Resource Investigation of the Proposed Lake Brekken and Lake Holmes Recreation Area, North Dakota,
Kent N. Good. Jul 78, 21p
Contract DI-8-01-62-11310

The University of North Dakota Anthropology-Archaeology Department undertook an intensive pedestrian survey of the proposed Lake Brekken-Lake Holmes Recreation Area. The survey was conducted to identify any cultural resources, whether historical, archaeological, architectural, or paleontological, on these lands which may be affected by the proposed project.

PB80-218936 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Preparing Directories to Local Outdoor Recreation Facilities.
Final rept.,
Roger E. McCay, David A. Gansner, and Jane R. Riddle. 31 Jan 78, 21p NEFES/80-113, FSGTR-NE-46

Development of a good guide to local outdoor recreation facilities can be accomplished in five basic steps. Knowing your users and what information they need are key ingredients to success. The procedure outlined here was used successfully in northeastern Pennsylvania in 1976.

PB80-220023 PC **A21**/MF **A01**
National Park Service, Tucson, AZ. Western Archeological Center.
Excavations at Gu Achi. A Reappraisal of Hohokam Settlement and Subsistence in the Arizona Papagueria.
Final rept.,
W. Bruce Masse. Aug 80, 481p NPS/WAC-80-07, WAC/ANTHROPOLOGY-12

Portions of the Gu Achi Site, a major pre-Classic period Hohokam settlement in the northern part of the Papago Indian Reservation, were excavated in the summer of 1975 by the National Park Service. The excavation focused upon a burned ramada structure around which several hearths, storage pits, and large ceramic storage vessels were clustered. Analysis of these features and over 25,000 artifacts indicate that Gu Achi was occupied during the late Pioneer period (about AD 500) and continuously occupied until the Sedentary period (about AD 1100).

PB80-222946 PC **E07**/MF **E07**
Building Research Station, Watford (England).
Third World Urban Housing: Aspirations, Resources, Programmes, Projects.
c1977, 246p
Prepared by Shankland Cox Partnership, London (England).

It has been found that by the turn of the century the population of the developing countries will have doubled. About half this population, more than 3000 million people, will be living in poor rural housing. This report covers the whole range of problems encountered from devising a housing

strategy to planning and implementing projects on the ground. It should prove useful not only to politicians and administrators in third world countries, but also to the architect, engineer or social worker in the field.

PB80-223969 PC **A07**/MF **A01**
Brookings Institution, Washington, DC.
Parks, Recreation, and Historic Preservation Allocations Under the Community Development Block Grant.
Final rept.,
John S. Jackson, III, Paul R. Dommel, and Jill S. Ehrenreich. Dec 79, 139p
Contract HUD-H-2223R
Sponsored in part by Heritage, Conservation and Recreation Service, Washington, DC.

The report is the second on the use of community development block grant (CDBG) funds for urban parks, recreation, and historic preservation projects. In 1978 the Heritage Conservation and Recreation Service (HCRS) of the Department of the Interior contracted with Brookings to extend its HUD sponsored research for CDBG program, adding the topic historic preservation to the park and the recreation analysis (started the previous year).

PB80-225337 PC **A15**/MF **A01**
American Institutes for Research, Washington, DC.
National Evaluation Program, Phase I: Assessment of Victim/Witness Assistance Projects.
Final rept.,
Roberta C. Cronin, and Blair B. Bourque. May 80, 344p AIR-75202-5/80-FR
Contract J-LEAA-020-78

The study reports on an LEAA-sponsored assessment of victim/witness assistance projects nationwide, which included a mail survey at 280 active projects, visits to 20 sites, and a comprehensive review of the project evaluation literature. The study identified three different intervention models or styles, distinguished by target population, point of intervention with clients, and service characteristics. Of 227 survey respondents, 39 percent were identified as 'victim model' projects, 47 percent as 'witness model' projects, and all percent as 'victim-witness' model projects. Based on the evidence the authors conclude that from the process standpoint, projects of all three types are by and large delivering what is expected of them and pleasing their clients and other observers in the process. Not much is known about how well these projects are fulfilling their impact expectations, however, except in the witness notification area. As a corollary, little is known about which types of projects produce the best results and why. The significance of these findings for future evaluation efforts is discussed.

PB80-225865 PC **A16**/MF **A01**
Urban Inst., Washington, DC.
An Analysis of Modifications to Social Security Laws Necessary to Increase Coverage of Disabled Individuals with Occupational Diseases.
Final rept. Sep 78-Feb 80,
Richard S. Toikka, Peter Greenston, Charles Thorpe, and M. Hagan. Feb 80, 371p ASPER/PUR-78/0148/A
Contract DL-J-9-M-8-0148

The report describes research related to the coverage, participation, and compensation of persons with occupational diseases under the Social Security Disability Insurance Program. The eligibility rules in the major disability compensation programs are reviewed and summarized. Data from the 1972 Social Security Survey of Health and Work Characteristics are used to construct a profile of the disabled population and an analysis of the determinants of severity, type, and work-relatedness of disabilities is performed. The pattern of benefits received in private and public programs is examined and related to the eligibility requirements. The characteristics of non-participants in major programs are examined to determine whether they met the eligibility requirements, had knowledge of the programs and had ever applied. Estimates were made of the number of eligible non-participants. Also undertaken were analyses of the adequacy of compensation for occupational disease cases and a study of the problems involved in the design of medical standards for disability compensation systems. The award process was also evaluated using a match of survey and program record data to determine the comparative success of occupational disease applicants in obtaining benefits. Finally, an analysis of the impact of changing eligibility rules in Social Security Disability Insurance upon eligibility and participation rates was conducted.

PB80-226673 PC **A14**/MF **A01**
Mathematica Policy Research, Inc., Princeton, NJ.
A Legal and Economic Analysis of Policy Recommendations to Improve the Existing Multiprogram Welfare System.
Final rept.
Jun 77, 307p SRS-76-11
Contract SRS-500-76-0012

The study examines legal and administrative interation of Aid to Families with Dependent Children (AFDC) program with each of the other transfer program. It identifies existing inequities, administrative complexities or undue fiscal pressures arising from the interactions of the AFDC and numerous other transfer programs. The report recommends possible plans of action to alleviate or remove identified problems.

PB80-227838 PC **A04**/MF **A01**
Berkeley-Charleston-Dorchester Council of Governments, Charleston, SC.
Feasibility Study for Proposed Exchange Park Coliseum, Charleston, South Carolina.
Sep 80, 55p EDA-80-0133
Prepared in cooperation with Zuchelli, Hunter and Associates, Inc., Annapolis, MD., Ehni Associates, Charleston, SC., and Robbins-Bentler, Tampa, FL.

The Charleston area is expected to experience growth in population and income capable of supporting a coliseum facility to accommodate a variety of spectators and cultural events. Total attendance projections are estimated at over 450,000 annually. There are no current or proposed facilities within Charleston that would compete with the proposed coliseum at the Exchange Park site. An 8,000-seat facility is expected to be sufficient to meet user demand by 1985. Once full operation is achieved, it is projected that the proposed coliseum could realize approximately $175,000 per year in total net revenue. Capital construction costs of the proposed 8,000-seat coliseum, seating system, and storage building for the seating system are estimated to be approximately $9,443,000 in 1981 dollars.

PB80-813199 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Juvenile Delinquency. 1978-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Jun 80,
Mary E. Young. Jul 80, 75p
Supersedes NTIS/PS-79/0835, and NTIS/PS-78/0832. See also 1964-1977, NTIS/PS-79/0834.

Reports on crime by young offenders are cited. Studies are included of delinquency statistics and prevention measures, vocational guidance, high school dropouts, employment and rehabilitation, and assessments of juvenile diversion programs. (This updated bibliography contains 70 citations, 14 of which are new entries to the previous edition.)

PB80-816077 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Crime Prevention and Law Enforcement Through Community Relations. 1964-September, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Sep 80,
Mary E. Young. Oct 80, 131p
Supersedes PB80-800022, and NTIS/PS-78/1008.

Selected abstracts covering aspects of community relations to aid in law enforcement and crime protection are cited, including the prevention of drug abuse, the abatement of community disturbances, aiding in work release and halfway house programs, and helping the police and community understand interrelated problems and opinions. (This updated bibliography contains 123 citations, 8 of which are new entries to the previous edition.)

SHR-0003182 PC **A03**/MF **A01**
Clarion County Office of the Commissioners, PA.
Case Study of the Clarion County Human Resources Development Commission.
Ross Butterworth, and Anne Reinert. 30 Jun 78, 35p
See also related document, SHR-0003183.

This case study examines the coordination of human services in Clarion County, Pa., as undertaken by the county commissioners with the aid of the Human Resources Development Commission (HRDC). After formation of the HRDC, Clarion County was designated one of five demonstration projects for services coordination in the State. Following a presentation of the history and formation of the HRDC, the functions of the HRDC are discussed. The HRDC, which provides for a coordinated comprehensive human services system designed to encourage the involvement of the public, is based on the belief that increased involvement by the public in the human services enterprise will improve the credibility of the service system in the county. By involving appointed representatives of the citizenry and service agencies, a cooperative approach to the delivery of human services is being used to establish accountability and improve the administration and delivery of services. As outlined in the bylaws, specific objectives of the HRDC are as follows: (1) provide county commissioners with a monitoring mechanism to identify and assess existing human resources and recommend service priorities; (2) provide county commissioners with a planning mechanism to identify needs, develop a network for existing services, and review and comment on proposals for service within the county; (3) serve as a client advocate to facilitate better overall relations and generate needed programs; and (4) give county residents an opportunity to advise and recommend human resource needs to county commissioners. The structural relationships, coordination process, group problemsolving procedures, public education, system development, planning, evaluation, financing, personnel policies and procedures, the developmental disabilities task force, and other program activities are discussed. Responses to the HRDC are reported, as supplied by county commissioners, agency directors, and State elected officials. Future considerations for the operation of HRDC are outlined. References are provided.

SHR-0003183 PC **A04**/MF **A01**
Clarion County Office of the Commissioners, PA.
Clarion County Human Resources Development Commission Program Proposal Format.
1978, 56p
Revised program planning guidelines effective January 1, 1979. See also related document, SHR-0003182.

This is one of four documents developed in conjunction with the Clarion County, Pa., Human Resources Development Commission project to improve the local public accountability of social service programs and the quality of operations in those programs. The 'Program Proposal Format' outlines a planning process designed to improve local program planning. The outline for program planning includes the following elements to be applied step - by - step: (1) background information, (2) problem statement, (3) analyses and community need assessment, (4) priorities, (5) program activities, (6) program support elements, and (7) evaluation plan. Background information includes identification of the local sponsor and a presentation of the program synopsis, which includes a brief description of the program's purpose, its target population, and its name. The problem statement should specify the problem or problems for which the program is being established. Community need assessment provides a detailed analysis of the problems identified, the citizens experiencing those problems, and the impact of the problem on the community. The fourth step is concerned with establishing priorities for problems and subgroups in the problem population. The development of program activities includes a statement of the program rationale, goals and objectives, intervention strategy and related activities, and an explanation of how policy will be set and monitored in the program. A presentation of program support elements

involves descriptions of facilities and equipment, staffing, and fiscal information. Evaluation plan design elements are presented in the appendix, along with budget suggestions and detailed information on procedures to be followed in each of the steps of program planning.

SHR-0003186 PC **A15**/MF **A01**
Community Research Applications, Inc., New York.
Nursing Home Ombudsman Services for the Elderly. Program Development Handbook for State and Area Agencies.
Leonard Steinbach. Oct 77, 330p DHEW/PUB/OHDS-78/20022

To provide information which will assist State and Area Agencies on Aging to fulfill their service development, technical assistance, and monitoring responsibilities in the provision of nursing home ombudsman services for the elderly, this handbook has been developed as part of a series of publications by the Administration on Aging. The handbook was based on a comprehensive review of all available materials about nursing home ombudsman services; site visits to two Department of Health, Education, and Welfare Regional Offices, three State Agencies on Aging, and six Area Agencies on Aging; discussions with four experts in the nursing home ombudsman field; a review by those same experts of the first draft; and a review of the outline and first draft by a task force of Regional Office, State, and Area Agency representatives. The topics discussed in the handbook include Medicare and Medicaid; Federal, State, regional, and local agencies handling health - related services; legislation and regulations which involve long - term and patients' rights; definitions of various service components which comprise nursing home ombudsman services; and staff organization and training. Other subjects addressed revolve around suggested alternative models of nursing home ombudsman service delivery, such as the lead agency concept, the single - agency concept, and the committee concept. In addition, the role of State and Area Agencies in the ombudsman program are detailed in terms of program development, advocacy, funding, monitoring and assessment, and training and technical assistance. References regarding the most important resources for technical assistance and information, and an annotated bibliography of key documents are provided. Appendices contain Medicare and Medicaid forms, resource and Area Agency involvement questionnaires, lists of foundations and State Offices of Volunteerism, interview training material, complaint investigation process and related office procedure forms, glossary of terms, a consumer's guide to nursing home care, and a sample program brochure.

SHR-0003191 PC **A05**/MF **A01**
George Washington Univ., Washington, DC. Social Research Group.
Adolescence Research Opinion and National Youth Policy: What We Know and What We Don't Know.
Stephen P. Heyneman, and William Daniels. 1976, 82p
Contract DHEW-105-76-1120
Workshop Proceedings on Youth Research, March 8 and 9, 1976. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003191/ES.

A planning initiative is currently underway at HEW by the Office of the Assistant Secretary for Planning and Evaluation to define a long - range role for youth in relation to the community. As part of this endeavor a 2 day conference entitled 'The Workshop on Youth Research' was held. Its purpose was to obtain a first hand, accurate, and representative perspective from experts about where youth research currently stands and where it is going. Additionally, the workshop sought practical suggestions for appropriate roles other than funding which government can play in youth research. This report interprets and summarizes the views of workshop participants, clarifying specific issues on which there was agreement and disagreement, and trying to separate these two categories of issues and consider their implications for a policy on youth. Over 60 issues were raised in a survey of participants prior to workshop attendance, and from these issues 4 themes were identified for discussion at the workshop: rights and privileges versus obligations and responsibilities, the role of the school, 'normal' youth, and the relationship of the adolescence research community to the various branches of government. A question reflecting a wide diversity of concerns and perspectives was developed for each theme and presented to the participants for their reactions. The pros and cons of developing a national youth policy were reported, and suggestions for issues to be emphasized should a national youth policy be developed, such as segregation by age, normal adolescent urges, and the adolescent search for adventure were discussed. Similar discussions centered on the use of government centers for the dissemination of research data and information, improved funding procedures, and themes for a research agenda. The appendix contains a summary of points raised in each session.

SHR-0003195 PC **A09**/MF **A01**
Northern Illinois Univ., De Kalb. Center for Governmental Studies.
Planning for Mental Health, Developmental Disability and Substance Abuse Services.
Robert Agranoff, Alex Pattakos, Jo Anne Tomczak, Alice Knowles, and John Schuetz. Jan 79, 199p
See also related document, SHR-0003196. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003195/ES.

This plan was developed for one of the planning areas designated by the Department of Mental Health and Developmental Disabilities of the State of Illinois, Planning Area 20607. The region centers on the city of Aurora and includes a mix of urban, suburban, and rural areas. Information derived from social indicators, questionnaires sent to providers of mental heath services, State statistics, a consumer health survey, and two community forums developed a picture of existing community services for the mentally ill, the developmentally disabled, and those who abuse services. Gaps identified included lack of 24 - hour availability for those who are mentally ill or developmentally disabled. Only the substance abuse programs offered evening and weekend hours and 24 - hour telephone service. Residential care, educational programs, and substance abuse prevention programs were other identified needs. The goals developed by the survey included greater availability of services in the evening and on weekends, greater integration of service delivery, and specific steps to meet identified needs. This highly statistical report contains tables, listings of available services, statistics on costs and client characteristics, appendices, notes, and references.

SHR-0003196 PC **A10**/MF **A01**
Northern Illinois Univ., De Kalb. Center for Governmental Studies.
Inventory of Mental Health, Developmental Disability and Substance Abuse Services.
Robert Agranoff, Alex Pattakos, and Jo Anne Tomczak. Jul 78, 208p
See also related document, SHR-0003195. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003195/ES.

This computer printout inventory of service agencies, services offered, clients served, and service charges was developed as part of a master mental health plan proposed for an area surrounding the city of Aurora, Ill. The area is officially known as the Department of Mental Health and Developmental Disabilities Planning Area 20607. It serves a consortium of six townships in Southern Kane County and Kendall County, representing a mix of urban, suburban, and rural areas. Before developing goals and recommendations, the Center for Governmental Studies of Northern Illinois University surveyed all existing services in this area. This inventory is the result, and supplies the name of the agency, type of client served, address, geographic area serviced, sources of financial support, auspices (voluntary, governmental, proprietary), hours of operation, methods of obtaining service, age groups served, sexes served, target population, primary purpose of the program, and range of services offered. Information on methods of charging clients, the frequency with which clients are seen, and procedures used to obtain other services from other sources is also included.

SHR-0003198 PC **A09**/MF **A01**
National Inst. of Law Enforcement and Criminal Justice, Washington, DC.
Special National Workshop on Mental Health Services in Jails. Service Delivery Models.
Carole H. Morgan. Jan 79, 194p
Contract J-LEAA-022-6
Prepared for a Workshop September 26-29, 1978 in Baltimore, MD. Revision of earlier report. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003198/ES.

Seven models for the evaluation of mental health service delivery programs in jails are described. The emphasis is on the provision of services in intake, screening, and classification; prevention; staff training; crisis intervention; ongoing treatment; and followup referrals. Individuals in need of mental health care have become so prevalent in detention facilities that they are considered a priority management and treatment problem. The release of persons from mental hospitals without proper survival skills, job placements, or supervision has led to encounters with the criminal justice system. Mental health community support programs have been established to assist released patients and to intervene in alternative processing, but jails are too frequently used as a disposal for both the mentally ill and the mentally retarded. Because the link between jails and human services has not traditionally been strong, the National Institute of Mental Health, the Law Enforcement Assistance Administration, and the National Institute of Corrections cosponsored a 1978 national workshop on mental health services in jails. Six individual systems were eventually selected for workshop presentation as model mental health / jail service delivery programs: Marengo County, Ala.; Los Angeles County and Napa County, Calif.; Monmouth County, N.J.; Cuyahoga County, Ohio; and Whitman County, Wash. The State of Michigan was chosen as the seventh model to demonstrate a comprehensive statewide approach to the problem. Issues raised as a result of site visits and personal discussions with program representatives in the course of the survey pertained to special mental health needs of female inmates, separation of competency - sanity evaluation responsibility from treatment responsibility, suicidal inmates, and sheriff - jail manager support for successful program operation. There appeared to be no collaborative effort by jail and mental health personnel to share information despite mutual involvement in programs. Eighty - one programs were implemented, however, in the face of such obstacles. Each program was able to establish institutional services regardless of structural restrictions. Supporting data and illustrations, references, a bibliography, and appended information and forms pertinent to program descriptions are included.

SHR-0003233 PC **A05**/MF **A01**
Welfare Research, Inc., Albany, NY.
Feasibility of a Coordinated Funding Approach to Services for the Mentally Retarded.
Final rept.
DeWitt John. Feb 79, 86p
Grant OHDS-18-90733
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003233/ES.

The feasibility of New York State's adopting a consolidated funding approach for services to the mentally retarded was examined in this study. The objectives were (1) to test the feasibility of such an approach by examining organization, management, and administration of the present services structure, (2) to review current reporting procedures in light of implementing such an approach, (3) to develop a plan for the implementation of such an approach, and (4) to propose guidelines for conducting a demonstration study. These objectives were accomplished, but not as planned nor as completely as had been hoped. For the study, a literature review, site visits, and interviews with key State and local officials were conducted. The lessons learned from previous attempts at interagency coordination were used to develop guidelines for the New York approach to creating a funding pool. An analysis of the major issues that must be handled by any effort to develop a consolidated funding mechanism identified nine technical requisites and six political tasks which must be addressed. An analysis was then made of the special

difficulties the State would encounter in meeting these requisites. A brief summary of the major barriers to the testing and implementation of such an approach demonstrated that consolidated funding may be feasible for the State. A chart and footnotes are included.

SHR-0003234 PC A09/MF A01
Center for Action Research, Inc., Boulder, CO. Youth Development Program.
Design for Youth Development Policy.
Tom Bird, Sylvia L. Beville, Olive Carlson, and Grant Johnson. Feb 78, 193p DHEW/PUB/OHDS-78/26042
Contract DHEW-105-75-2103
Revision of report dated June 1976. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003234/ES.

For the past 7 years, DHEW's Office of Youth Development (now the Youth Development Bureau) has sponsored efforts to determine how the Federal Government can most effectively support State and local efforts to develop coordinated youth development and delinquency programs. This 1978 revision of a 1976 report presents a detailed description of a promising approach known as 'capacity building for youth development.' It argues that the development of an effective policy requires that it be based on an understanding of institutional dynamics and their effects on young people. Such an approach can facilitate efforts to develop better institutional procedures in such settings as the educational establishment, the world of work, juvenile delinquency programs, and diversion programs. For example, the school system has been structured in such a way as to convince many youngsters that they are destined to be losers and that success lies in being able to cheat. With such an understanding of the dynamics of schools, the educational system can be restructured to give youngsters the chance to learn to become valuable and ethical members of society. The process of restructuring such institutions has to be based on a realistic appraisal of the amount of restructuring needed and recognition that the process of change will result in institutional conflicts among the affected parties. This tension can be used constructively by involving the affected parties in an institution (such as teachers in a school system) in the process of change. Since there are several institutions which play major roles in shaping the lives of young people, there is a need for continued cooperation among these institutions. A brief chronology of events affecting the creation of a youth development policy is appended. References and figures are included.

SHR-0003235 PC A05/MF A01
Texas Joint Committee on Long-Term Care Alternatives, Austin.
Well-Being in Old Age: Essential Services.
Technical rept. no. 4,
Bonny Gardner. 1978, 94p

Data from State and Federal sources and interviews with service providers and consumer groups throughout the State of Texas were used to develop this summary of the needs of elderly persons, programs to address these needs, and gaps in service. Although the family continues as chief caretaker of elderly persons in the U.S., this care is limited by rising medical and service costs, the increased geographic mobility of adult children, and the entry of women into the work force. Almost all elderly persons need income support and medical services. Those advanced in age or debilitated may need help with meal preparation, housekeeping, and personal grooming. They may also need health services delivered to the home, day care, or housing which provides a continuum of support services. Federal and State funding guidelines are biased toward institutional care, leaving many community care options largely underdeveloped. Yet, most elderly say they would prefer to remain at home and studies have shown that the chronic illnesses of old age often can be better managed in a community context without the artificial dependency induced by nursing homes. Community care may even slow or reverse degenerative processes. Gaps in service are particularly acute for minority aged, those in rural areas, the near - poor, and the mentally - ill aged. Delivery systems in Europe and a proposed model for Texas are described. Notes, references, statistics, and charts document the findings.

SHR-0003240 PC A03/MF A01
New England Municipal Center, Durham, NH.
New England Regional Human Services Demonstration Project.
Final rept.
Lenore Howe. 1978, 29p

Rockingham County, N.H., had human services delivery problems similar to those faced by many New England communities -- the more populated areas placed ever - increasing demands on the human services system while the rural areas felt the Federal government should not be involved in human services delivery. In addition, the county government had no coordinating mechanism for this ever - growing component of the county budget. The New England Municipal Center experiment used Title XX funds (in cooperation with HEW) to set up a 3 - year partnership project to demonstrate the benefits of long - range human services planning. A permanent organizational structure was set up which involved community officials, citizens, representatives of human services organizations, and State legislators. These communities and commissions examined certain areas of human services delivery, then coordinated their recommendations so the county could develop a master delivery plan. The project had many benefits. A survey of service needs was made. Manuals and workshops to improve delivery were developed. Citizens became involved in human services planning and the various sections of the county developed a coordinated approach. The experiment used similar counties who spent Title XX funds on delivery without a coordinated approach, as controls. The Rockingham planning system resulted in a better level of service at lower cost. This system could be replicated easily in any other New England county.

SHR-0003250 PC A16/MF A01
Mississippi State Dept. of Public Welfare, Jackson.
Mississippi Cost of Services Project.
Final rept.
Nov 78, 372p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003250/ES.

This project has been a joint effort of the Mississippi Department of Public Welfare, the Administration for Public Services, and the Office of Planning, Research and Evaluation of DHEW. The fundamental purposes are threefold: to identify and define quantifiable, measurable units of the various social services provided by or through the Department of Public Welfare; to identify and define the total cost of the various social services; and to use units of service and total service cost to compute both the unit and total cost of each social service, and the total cost of each service by eligibility category and geographic areas as baseline data for annual Comprehensive Annual Services Plan (CASP) planning purposes. The three fundamental methods developed in the project for collecting and manipulating units and cost data can be generally classified as those dealing with services delivered by department employees, services provided by POS (Purchase of Service) providers, and services of a special nature delivered in various other ways. While there are only three fundamental data handling arrangements, there are some six provider types, each of whom have a detailed set of unique procedures requiring a separate detailed processing subsystem. Charts, graphs, and appendices providing descriptions of specific features of the cost of services system are provided.

SHR-0003251 PC A03/MF A01
Texas Joint Committee on Long-Term Care Alternatives, Austin.
Admission to a Nursing Home: An Exploratory Study of the Decision-Making Process.
Technical rept. no. 3.
1978, 39p

The Joint Committee on Long - Term Care Alternatives of the State of Texas sent questionnaires to physicians, agencies that provide in - home services, and the Community Care Program Staff of the Texas Department of Human Resources to find out how the decision to enter a nursing home is made. Physicians play a major role in determining when a person is admitted to a nursing home. They tend to confer with families but often do not consult the patients themselves and often bypass other professionals (hospital discharge planners and social workers). Patients who live alone with no one to care for them are at high risk for admission to a nursing home and these admissions are often made for nonmedical reasons. Although hospitalization often precipitates nursing home admission, impaired mobility and the absence of family support systems are also major factors. Physicians have limited awareness of community care services (foster homes, meal programs, day activity centers, and homemaker services) and as a result they make limited referrals to such services. The Community Care Program staff is not involved in discharge procedures and nursing home admission decisions, which limits the effectiveness of its programs. There is much public and professional misunderstanding about the purpose, availability, and effectiveness of community programs which offer alternatives to nursing home care. The questionnaires and summaries of response rates are appended. (Author abstract modified).

SHR-0003253 PC A06/MF A01
Michigan Univ., Ann Arbor. Rehabilitation Research Inst.
Program Evaluation Approaches for State Rehabilitation Agencies: Current Status and Future Directions. Series 1, Monograph I. Michigan Studies in Rehabilitation.
Juliet V. Miller, Chia Chih Lee, and Hosik Won.
Sep 77, 104p
See also related documents, SHR-0002754; SHR-0003252; SHR-0003254; SHR-0003255. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003253/ES.

This monograph reviews the current status of program evaluation in State vocational rehabilitation (VR) agencies, focusing on the reasoning behind the evaluations and needed improvements; various models and handbooks are discussed. Reasons for developing better means of evaluating State VR programs include increased demand for accountability in human service programs, continued stiffening and refinement of Federal standards, and an increase in funding of evaluation programs. Although most programs now integrate planning, implementation, and evaluation, and VR programs are commonly evaluated according to the nine standards of the Rehabilitative Act of 1973 (serving the target population equitably, placing clients in jobs and avoiding delays in helping them, using resources efficiently, seeing that clients retain benefits they obtain through rehabilitation, and ensuring that counselors have manageable caseloads, etc.) A recent study of 69 agencies, indicates that program evaluations are not being done by many agencies. Often, these evaluations are crisis - oriented rather than development - oriented; their evaluating personnel are usually poorly trained, and target populations are not well - defined, followup studies are not done, and sophisticated methods are not used. Nine published approaches are described, detailing the varied methods of conducting and understanding evaluations. Models are provided including handbooks for beginners listing different reasons for doing evaluations, ways to develop realistic criteria to judge programs, discussions of evaluation theory, and models for integrating the parts of program development with evaluation.

SHR-0003254 PC A05/MF A01
Michigan Univ., Ann Arbor. Rehabilitation Research Inst.
Survey of the Current Status and Program Evaluation Needs in the State-Federal Rehabilitation Program. Series 1, Monograph II. Michigan Studies in Rehabilitation.
Ralph M. Crystal. 1978, 86p
Grant SRS-15-59021

Current problems, needs, and concerns in rehabilitation program evaluation are explored in this monograph. To examine these issues, a content analysis survey was conducted of the 1978 Program and Financial Plans (PFP's) submitted in 1977 by each State rehabilitation agency to the Rehabilitation Services Administration (RSA); the PFP's reviewed covered fiscal years 1978, 1979,

and 1983. The analysis of the PFP's focused on (1) articulation of agency goals and objectives through a continuous assessment of client and program needs, (2) development of linkages between State agencies and RSA to enhance dissemination, utilization, and communication of evaluation information, (3) presentation of evaluation information to program decisionmakers on a timely basis and in an understandable format, (4) recognition of the political context within which evaluation occurs, and (5) development of a comprehensive, competency - based client - outcome evaluation strategy. Findings showed that program evaluation can be used to help manage the rehabilitation program by assessing the needs of the target population, developing agency goals and objectives based on client needs and legislative mandates, evaluating the achievement of those goals, and implementing results in the program planning and development process. Achieving these steps can provide the initial framework for a comprehensive program evaluation strategy. Detailed findings in the areas of recruitment and selection, restoration and training, employment, and capacity building indicate a consensus of opinion among the State agencies surveyed that thought was being given to program evaluation and how it can help the functioning of the rehabilitation program. Implications for improved evaluation strategies include an assessment instrument such as a questionnaire administered periodically to constituents of the vocational rehabilitation program; timely and understandable evaluation formats organized by the State agency evaluation consultant; careful definition of the type of evaluation information needed by legislators for justifying the program, or by program planners examining differential outcomes; and the implementation of a competency - based client - outcome evaluation model. References and survey findings are provided.

SHR-0003255 PC **A07**/MF **A01**
Michigan Univ., Ann Arbor. Rehabilitation Research Inst.
Handbook of Program Evaluation Studies. Utilization Series: 1. Michigan Studies in Rehabilitation.
Juliet V. Miller, and James F. Wargel. 1978, 134p
Grant SRS-15-59021
See also related documents, SHR-0002754; SHR-0003252 -- SHR-0003254.

This handbook of program evaluation studies is intended to be a tool to help program evaluation staff in State vocational rehabilitation (VR) agencies enhance their current program evaluation strategies by alerting them to procedures being used in other State agencies, to provide further information about the current status of State rehabilitation agency program evaluation, and to increase communication among State agency program evaluators. The studies included in this handbook either are representative of a program evaluation activity directed at meeting the Federal program evaluation standards, or were focused on evaluating VR program components not directly related to Federal standards. Three organizational schemes were used to review the program evaluation studies: (1) input studies which provide information for use in program planning, (2) process studies which provide information for use in program revision or change. These three review techniques were then divided into subcategories for each study; e.g., the input section was divided into measuring the target population, estimating the VR target population, assessing client needs, planning for service delivery, and clarifying components of the referral process. The process section contains the subsections of data systems, case review procedures, factors of manageable caseloads, caseload monitoring techniques, timeliness of service, and miscellaneous service delivery components occuring between acceptance for service and closure. The output section was divided into cost and client characteristics measured at closures, followup studies of retention of benefits and of client satisfaction with services, reasons for failure, and the outcome evaluation of special programs. Three indices are included to facilitate finding studies: index terms are assigned to each study, studies are listed by order of appearance in the handbook with the index terms listed alphabetically, and finally, the studies are arranged according to the Federal region in which they were completed. The handbook also can serve as a reference tool for program evaluators to design a variety of program evaluation studies.

SHR-0003269 PC **A13**/MF **A01**
Ontario Ministry of Community and Social Services, Toronto.
Children's Residential Care Facilities: Proposed Standards and Guidelines.
Sep 78, 294p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003269/ES.

Standards and guidelines for the residential care of children in Ontario, Canada, are proposed that represent a unique approach to covering crucial aspects of residential care. The intention of the Children's Services Division of the Ontario Ministry of Community and Social Services is to develop standards and guidelines relevant to all aspects of children's services, including residential care, foster care, information systems and records management, nonresidential casework, nonresidential child care, day nurseries, diversion, program evaluation, and special - function programs. The proposed standards and guidelines will establish the basis for an innovative approach to monitoring service delivery. They will make it possible to assess service delivery in terms of compliance with standards and attainment of guidelines. The Children's Services Division will have the responsibility for establishing a review process to monitor agency performance. In an effort to minimize the disruption of agency activities, most agencies will be reviewed only once every 3 years. Each set of standards and guidelines is preceded by a discussion of goals and underlying principles of standard and guideline establishment for a particular element in residential care. A bibliography is included at the end of each set of standards and guidelines. Contents of the standards and guidelines are indicated for six areas: (1) rights of children in residential facilities, (2) organization and management of residential services, (3) residential child care programming, (4) human resources in residential facilities, (5) community integration of residential facilities, and (6) physical plant in residential care. Appendices contain a glossary, a summary of documentation required by standards, a list of acts and codes cited, and standards from other jurisdictions used in developing the proposed standards and guidelines.

SHR-0003271 PC **A09**/MF **A01**
San Jose State Univ., CA. Joint Center for Human Services Development.
Developing Effective Mental Health Organizations. Summary Progress Report of the Continuing Education in Mental Health Administration Grant Project.
Final rept.,
James M. Kouzes, Jeannette M. Jerrell, Gary D. Bergthold, Paul R. Mico, and Gretchen P. VanderPlas. 1 Dec 78, 191p
Grant PHS-MH-14830
See also Appendix, SHR-0003272. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003271/ES.

Because existing management literature and training are based on the needs of private industry and do not address the special problems of mental health administrators, a special 15 - month management development effort was designed. Management teams from eight San Francisco Bay Area (Calif.) agencies participated. Because the 12 - county area was too large to make a single series of seminars feasible, the participants were divided into two groups; teams from the North Bay and the South Bay areas. Each set of seminars was as close in content as possible, but the needs of the administrators dictated some major changes between the two presentations. A detailed discussion on the conflict between participant needs and evaluation needs closed with participant needs prevailing. After 8 months, agency staff reported little change in operations, but managers felt they enjoyed much greater cooperation. Findings also indicated that managers were much more interested in learning skills than theory, and that they retained those items which were most relevant to their own situations. The training structure also proved important as the program required that participating agencies attend as top management teams and not as individuals. As a result, teamwork was emphasized. The trainer also addressed them as managers, drawing them into a new way of thinking of themselves; most were originally therapists and tended to slip back into that role. Program materials are described in detail, and statistical tables summarize the favorable evaluation findings.

SHR-0003272 PC **A06**/MF **A01**
San Jose State Univ., CA. Joint Center for Human Services Department.
Developing Effective Mental Health Organizations. Appendix to the Summary Progress Report of the Continuing Education in Mental Health Administration Grant Project.
Nancy J. Huck. 1 Dec 78, 119p
Grant PHS-MH-14830
See also parent document, SHR-0003271. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003271/ES.

The Program for Organizational Effectiveness was a 12 - month effort which combined seminars, workshops, and an on - site consultation to help mental health managers improve their agencies' operations. This appendix contains an overview of the program, a copy of the application for participation, and the agreement each participating agency signed. All agencies were required to send only management teams to the sessions and to continue through the full series plus the follow - up evaluation: a list of the 78 participants is included. The course outlines for each seminar state the goal of the session (i.e., developing a management team, applying management theory to a specific problem) and provides a seminar timetable, a list of participating staff, a list of handouts, and a bibliography. A series of five questionnaires was used to evaluate various aspects of the seminars and workshops, and one general questionnaire was used to evaluate the on - site consultation. In addition, separate questionnaires were administered to agency administrators and staff after the coursework was completed to determine if there has been any change in agency operations. Each of these questionnaires uses a combination of multiple choice and open - ended responses. Finally, the two forms used by the on - site consultants are provided -- an overall report of the visit, and a critical incidents form for noting events which might affect evaluation.

SHR-0003289 PC **A02**/MF **A01**
Center for Multicultural Awareness, Arlington, VA.
Minority Drug Abuse Prevention: An Overview of the State of the Art.
John L. Garcia. Feb 79, 15p
Presented at State Prevention Coordinators Conference, St. Petersburg, Fla., February 12-15, 1979.

When the National Institute on Drug Abuse Prevention realized that minorities were not being reached by prevention efforts, it began to develop a multicultural resource center. In 1977, these efforts culminated in the Center for Multicultural Awareness (CMA). CMA reviewed both State and local programs and found that the picture was not promising. At the State level, many programs asked minority representatives for advice but there was little minority representation at the policymaking level and few representatives of ethnic groups were being trained to work in the field. Therefore, CMA training efforts increased to reaching 54 minority participants and 39 State drug abuse prevention personnel in 1978. As this training focused on cultural awareness, CMA anticipates training 30 minority representatives to actually work in prevention programs in 1979. In addition, review of 70 local programs revealed that most materials were designed for a white, middle - class audience. Local directors, however, have developed a number of creative approaches to address the reasons young people turn to drugs and to provide true alternatives to drug use (recreation, job training, dealing with the system.) CMA has collected data on the approaches appropriate for use with American Indians, Asian Americans, blacks, and Spanish - speaking persons and plans to act as an advocate at the State and national level while working with local programs. The report contains charts and some statistics.

SHR-0003324 PC **A06/MF A01**
Rhode Island Statewide Planning Program, Providence.
Coordinating Human Services Delivery in Rhode Island.
Rept. no. 35,
Grace J. Beiser. Feb 79, 125p

This report discusses some theoretical aspects of service delivery coordination in Rhode Island, examines coordination projects undertaken by other States, presents an overview of coordination efforts in Rhode Island, evaluates results of a special survey of service providers in one section of the State, the Blackstone Valley area, and presents conclusions and recommendations. The report is an outgrowth of previous studies based on the premise that delivery of State personal services, particularly human services, can and should be improved. This report is part of a broader study of this subject. The report focuses on the coordination of State human service programs at the service delivery level. The findings presented are based on the work of the earlier subcommittee and task force, on results of a special survey, on the recorded experiences of other States with delivery level - services coordination, and on various studies recommending specific changes in the organization and delivery of State services in Rhode Island. After reviewing both human service delivery in one area of Rhode Island, the Blackstone Valley, since it reflects many of the economic and social strengths and needs of the State. The report concludes that improved coordination of human service delivery is both needed and desired in Rhode Island and recommends the following steps: (1) standard service districts should be established, (2) a service center development team should be created and prepare a detailed proposal for establishing a State - owned prototype multiservice center, (3) the Department of Social and Rehabilitative Service should develop a plan for regional colocation of service delivery and develop regional networks for service providers, and (4) State providers should colocate with other public or private service agencies in the same area. Tables, maps, footnotes, and appendices are included.

SHR-0003330 PC **A04/MF A01**
Virginia Office of the Secretary of Human Resources, Richmond.
Effects of Services Integration in Virginia at the Local and State Level.
Final rept.,
Patti Chrzan-Seelig. Oct 78, 62p
Grant SRS-11-90145

This report on the third and final year of local pilot projects and State efforts at services integration in Virginia found that services integration cannot be attained quickly or easily but must be systematically planned and implemented with support from the private and public sector. The most successful projects were those which set realistic goals. Although State Senate Bill 517 provided important impetus to coordinate and integrate human services at the local level, it was found that most of these efforts would have been undertaken without the legislation. Project summaries are provided for Carroll, Charles City, Fairfax and Montgomery counties, and for the cities of Chesapeake, Hampton, Roanoke, and Portsmouth. It was through the office of the Secretary of Human Resources that the grants were given to these localities and each project was monitored. Staff was hired to provide the local projects with technical help, to administer the grant, and to implement State integration linkages. A model for services integration was designed by the office during the first year. Efforts were undertaken to design a waiver process, conduct a study of regional boundaries for local services agencies, and to evaluate the projects. A State Agency Advisory Council should be formed to provide overall management of any future projects which may be undertaken since the liaison role of most State agencies, with the exception of the Welfare department, were nonexistent. Efforts should also be undertaken to develop an agreed - upon definition of technical services. It is anticipated that services integration projects will continue in the future. A copy of Senate Bill 160, a report on House Joint Resolution 80, and a technical assistance document are appended. No references are provided.

SHR-0003415 PC **A04/MF A01**
Pacific Consultants, Berkeley, CA.
Title XX Purchase of Service. Volume II: The Feasibility of Comparing Costs Between Directly Delivered and Purchased Services.
John Haller. 1979, 74p
Contract DHEW-105-77-7200
See also Volume 1, SHR-0003416. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003415/ES.

Two objectives were defined for the feasibility portion of the Title XX purchase of service (POS) study. The first was to determine the feasibility of comparing costs for purchased services with the costs for services that are directly delivered by State Title XX agencies. The second was to determine the usefulness of these cost comparison data for State decisionmakers. Two conditions must be met to attain these objectives. First, the two methods of provision (direct and POS) must be comparable and second, the data required for a cost study must be available. Also, to be useful, the cost comparison data must pertain to areas in which States have real choices. Thus, the issues of comparability between the direct and purchased methods, data availability, and usefulness of cost comparison data must be examined. The States selected for the study, Hawaii, Minnesota, Missouri, Ohio, Texas, and Virginia, offered the greatest number of services by both direct and POS. Researchers spent 1 week in each State, conducting interviews and gathering any relevant written material. Findings indicate counseling, homemaker / chore, and substitute care are the only large services delivered by both direct and POS in half or more the States studied. Homemaker / chore services are delivered by varying methods, including direct delivery, in more States than any other service. It is recommended that homemaker / chore be used as the basis for a cost comparison study rather than adoption, home management, information and referral, and transportation services, also investigated here. The results of the entire feasibility study indicate that State managers are now using cost comparison data because accurate data are not currently available and because their real choices about methods of delivery are limited. The findings suggest that State managers would use cost comparison data if two criteria were met: the data must pertain to an important area of real choice, and the data must be high quality, so that State managers can have confidence in the choices indicated by the data. Tables are provided.

SHR-0003416 PC **A06/MF A01**
Pacific Consultants, Berkeley, CA.
Title XX Purchase of Service. Volume I: A Description of States' Service Delivery and Management Practices.
Martin Weinstein, and Thomas Evans. Jan 79, 105p
Contract DHEW-105-77-7200
See also Volume 2, SHR-0003415. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003415/ES.

The prime purpose of this study is to present a comprehensive description of Purchase of Services (POS) practices among the States. Since Federal matching funds were made available for POS in 1967, the purchase of services has grown very rapidly. In order to tap a broad range of POS practices, researchers developed a matrix based on the overall magnitude of States' POS expenditures and on their relative use of public and private purchase. Based on these strata, nine States were selected for inclusion in the study: California, Colorado, Delaware, Georgia, Indiana, Massachusetts, Oklahoma, Utah, and Washington. Extensive data were collected in onsite visits to the State central offices and to local jurisdictions within each State, but personal interviews with Title XX personnel were the primary data source. Upon completion of the site visits, researchers reviewed and analyzed the individual States' data. Both commonalities and differences in POS practices were examined in order to fully describe existing management. A description of service delivery practices is divided into three major sections. The first presents the overall State expenditures for POS and discusses the factors which affect the interpretation of these data. Current trends are reviewed, followed by a discussion of POS provider types. The second reviews the service mix with particular attention to these services that are primarily purchased. This is followed by a discussion of why States use POS and the interdependence between services and method of delivery. The last section discusses how States are organized to manage POS and describes each of the management functions necessary to support POS. Tabular data are provided.

SHR-0003458 PC **A03/MF A01**
Dallas Independent School District, TX. Dept. of Research, Evaluation and Information Systems.
Application of a Theoretical Control Strategy in Early Intervention for the Handicapped.
Daniel J. Macy. 1979, 45p
Presented at a roundtable session in the annual meeting of the American Education Research Association, San Francisco, Calif., 1979.

An innovative evaluation strategy was developed for Project KIDS, an early intervention program for handicapped infants, toddlers, preschoolers, and their families conducted by the Dallas, Tex., school system. Because of the special nature of the study population, matched pair and control group designs were not feasible. The 17 children in the evaluation sample exhibited a wide range of mental and central nervous system handicaps ranging from Down's syndrome to cerebral palsy to multiple developmental difficulties. After rejecting a wide range of standard evaluation strategies because of the difficult nature of the subjects, the school system decided to ask a panel of four experts to evaluate the potential of each child without intervention; this score was then compared with actual gains following program participation. Statistical validation of this strategy found that the scores projected by the experts were reliable and relatively free of measurement error. No significant bias was shown and there was significant correlation between the predictions and actual pretest performance on the Bayley mental scale. Findings showed that the children made significant developmental progress during the 12 - month observation period, gaining 8.5 months on the Bayley mental scale and 7 months on the Bayley motor scale. The motor gains were significantly more than the experts predicted. The significance of other gains could not be determined because of difficulties inherent in using standard language tests with multiple - handicapped children. Raw study data, statistical tests, and references are included.

SHR-0003459 PC **A02/MF A01**
Utah Dept. of Social Services, Salt Lake City.
Unification: The Utah Experience.
Anthony Mitchell. Jan 79, 14p

Since the establishment of the Utah Department of Social Services in 1967, the department has had a mandate 'to consolidate and coordinate social services.' A series of Utah studies has proposed sweeping consolidation plans, and several federally - funded demonstration projects (most noticeably the ones carried out by the District V Human Service Center) have sparked the State's initiative to achieve service integration at the policy development or planning level, the service delivery or pathway level, and on the organizational structure level. Although the State has centralized policy setting activities, it has actively sought to decentralize those program tasks, such as program administration and budget preparation, which are most appropriate to the local agencies. Most of the State's experience in integrating services has been in rural areas where distance, scant population, and other factors require such an approach. Most private social service agencies serve as important adjuncts to public agencies. A description of how the State is divided into service districts shows some of the problems which have resulted from such divisions. Utah is the only State with an umbrella State social service agency that shares Title XX funding with local governments. Such an approach requires joint efforts between State and local agencies in terms of planning, budget review, evaluation, and resource allocation. Utah's unification efforts have mainly centered around the reallocation of available resources rather than the creation of new resources. This effort has enabled the State to coordinate the programs offered by the myriad of service agencies, thereby avoiding unnecessary duplication of services. No references are provided.

SHR-0003515 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Inst. for Research on Poverty.
Urban Impacts of the Program for Better Jobs and Income.
Sheldon Danziger, Robert Haveman, Eugene Smolensky, and Karl Taeuber. Jan 79, 43p
Revision of paper dated August 15, 1978.

Effects of President Carter's announced but rejected plan for welfare reform, the Program for Better Jobs and Income (PBJI), are analyzed on various measures of economic well - being of urban areas, particularly on income flows, job creation, poverty reduction, and fiscal relief. PBJI has three major components, including a nationwide minimum Federal cash payment for all the poor, public - sector service jobs for recipients able and expected to work, and an income tax credit. The Poverty Institute Regional and Distributional Model, employing several micro - data sets and sectorial data sets to trace the results of a change in income on alterations in the level and composition of consumption spending, was used to estimate results of PBJI. Among impacts identified are an aggregate total disposable income increase of $4.1 billion dollars, with standard metropolitan statistical areas (SMSA's) having higher per capita incomes experiencing a smaller change in income (approximately 0.64 percent as compared with a 0.4 increase for SMSA's with median income averages); a higher income increase for fast rather than slow growing States; a decrease in measured unemployment where public sector jobs are located, and a simultaneous increase in labor force participation and employment; a reduction of poverty in SMSA's with higher unemployement rates, higher incidence of preprogram poverty, and lower per capita income, particularly those located in New England and the South; and indirect and uncertain fiscal relief to States. Several long - term impacts on regional income disparities, regional and urban - rural migration patterns, and urban racial segregation patterns also are calculated. Tables and references are included.

SHR-0003516 PC **A03**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Overview of the Income Security System.
1 May 79, 47p

Traditional welfare programs are described, along with the social insurance programs and employment programs and policies designed directly or indirectly to assist the low - income population. Also, taxation and other policies that encourage private savings, investment, and provisions for retirement are discussed. The interaction of various programs designed to secure income under various circumstances is illustrated by tracing a hypothetical person's life experiences as they affect his income. Government policies that affect employment and employment income are discussed under the topics of macroeconomic policies, direct job provision, regulation of labor markets, and education and manpower programs. The Federal Government's encouragement of private savings is discussed through an explanation of relevant income tax credits. Social insurance programs, which provide an important supplement to employment income and savings under conditions which hamper normal income - earning power, are described. Income assistance programs, for those with insufficient earnings, savings, and social insurance (commonly referred to as 'welfare'), also are presented. General observations of the programs are discussed, and the breadth, diversity, and interdependence of the programs are noted. Of the large number of government programs which affect the earnings of the low - income population, most are not 'welfare' programs. Program diversity in the roles played by levels of government, in the form by which benefits are provided, and in the ways that need is measured and eligibility determined. Many facets of interdependency are found in the programs. The appendices provide individual program descriptions and a glossary.

SHR-0003517 PC **A04**/MF **A01**
Executive Office of the President, Washington, DC.
President Carter's Proposal for Welfare Reform: Work and Training Opportunities Act of 1979 and The Social Welfare Reform Amendments of 1979.
23 May 79, 73p

The Work and Training Opportunities Act of 1979 and the Social Welfare Reform Amendments of 1979 are designed to help more needy families become self - sufficient and to establish nationwide standards for minimum welfare benefits. The Act, which will be implemented by the Department of Labor, provides for 620,000 training and work opportunities for principal wage earners in low - income families with children. It will combine the programs currently conducted by State and local governments under the Work Incentive Program and the Comprehensive Employment and Training Act with a job search program. There will be a mix of training and reliance on actual job experience, an effort to find nontraditional jobs for women, and an effort to develop part - time jobs for women with young children. The Social Welfare Reform Amendments are designed to bring order out of the current conflicting welfare standards and benefits. The amendments will help strengthen the work requirements for two - parent families; they also will help States standardize and automate program administration, and, by simplifying the welfare rules, will help eliminate waste, fraud, and error. The two programs together should reduce State and local welfare costs by more than $900 million as the Federal share of Aid for Dependent Children is increased as Federally - funded jobs remove families from the partially State - funded welfare rolls. Charts and tables detail both the benefits anticipated and the estimated costs of both proposals. Details of program administration are also discussed.

SHR-0003539 PC **A16**/MF **A01**
Office of the Assistant Secretary for Planning and Evaluation (HEW), Washington, DC.
Summaries and Characteristics of States' Title XX Social Services Plans for Fiscal Year 1979.
Technical notes,
Gloria Kilgore, and Gabriel Salmon. 15 Jun 79, 369p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003539/ES.

Title XX Comprehensive Annual Service Program (CASP) plans for 1979 represent the fourth year efforts of States to describe their social services programs and obtain citizen input on public priorities. The technical notes presented here summarize data available in the final CASP plans for 1979 and compare them with data for 1978. The total Title XX estimated expenditures for 1979 are $3.96 billion, with the estimated Federal share being $2.498 billion. The estimates for Title XX social services reflect a $235 million increase (6 percent) over total estimates for 1978 ($3.725 billion). Most of this increase represents supplementary State funds for Title XX social services rather than an increased use of the Federal allotment. An analysis of State Title XX plans for 1979 shows the following changes in service eligibility: maximum eligibility levels for services decreased and eligibility criteria for services increased. Forty States are charging fees for Title XX services, compared to 39 in FY 1978. State use of fee schedules remains fairly constant. Of the 15 services analyzed for change over the 2 fiscal years, 13 services show an increase in estimated expenditures. While most services showed marginal increases, 3 services increased 18 percent to 24 percent: home - based services, day care for adults, and protective services for children. A technical note is provided for each of the major Title XX services provided by each State. Each note includes a general overview of the data from all the States and a breakdown of information on a State - by - State basis. Where possible, comparisons are given for 1979 and 1978 estimates. The appendix compiles the lists of services from the 51 State CASP plans. Tabular data are provided.

SHR-0003549 PC **A03**/MF **A01**
Maine Dept. of Human Services, Augusta. Planning and Evaluation Unit.
Impact of Imposing Fees in Title XX Services.
Deborah Smiley. 1 May 79, 42p
Grant SRS-11-90578

Several issues were examined in this study of possible impacts of expanding eligibility for Maine's Title XX services and imposing fees on those recipients whose income falls into a bracket higher than 115 percent of the State's median income. These issues were (1) the probability that expanded eligibility would result in decreased services to lower income citizens, (2) the question of whether fees would encourage responsible use of services, (3) the role of fees in helping clients attain self - sufficiency, (4) the extent to which clients would be able to pay a fee, (5) the assurance that fees would be related to client income, (6) the extent of fee charging necessary to expand services, and (7) the relative costs of administering fee schedules. The Maine Bureau of Resource Development, Planning, and Evaluation Unit of the Department of Human Services interviewed representatives of the Human Services Council, Title XX providers, and bureau personnel, and reviewed relevant literature and legislation. The Bureau found that most providers did not feel there would be a shift in agency populations if fees are charged and that some clients might be discouraged from seeking services. However, those seeking services would be encouraged to use them in a responsible manner and would be aided in attaining self - sufficiency. Literature reviews indicated that the client's ability to pay is uncertain -- a day care program in Florida reported that only one - third of clients paid a full fee -- and that no guidelines on fee - in - proportion - to - client - income exist. Of 10 responding States, none knew how much money had been generated through fee collection, but all indicated that fees were insufficient to expand services or cover the cost of administering schedules. In short, results do not encourage imposition of fees for economic reasons. Recommendations are provided in the event that fee imposition for the social reasons mentioned is decided upon. The survey instrument and data are appended.

SHR-0003551 PC **A04**/MF **A01**
New York State Temporary Commission to Revise the Social Services Law, Albany.
Children in Need: An Assessment of the Foster Care Program in New York State.
Interim Study rept. no. 7,
Norma M. Wedlake, Brian J. Wing, Fred L. Andersen, and Judith J. Twombly. Jan 78, 64p

An overview of New York State's foster care programs is presented in this interim report, by comparing New York's effort with other States through the use of recently compiled DHEW data. Also used as sources of information were the reports and audits of the Temporary State Commission on Child Welfare and the State and New York City Comptrollers. From the data available on the Aid to Families with Dependent Children -- Foster Care program (AFDC - FC), New York has proportionately more children in foster care than any other State (4.3 children in care per 1,000 children as compared to the national average of 1.7). The average monthly cost of providing AFDC - FC services in New York is reportedly the highest in the Nation ($514 per month, more than double the national average of $254 per month). In contrast to most States, a greater proportion of New York's AFDC - FC children are placed in institutional rather than family care settings (53 percent versus 25 percent nationally). In addition, studies indicate that an inordinately high proportion of children in New York are either unnecessarily placed in foster care or placed in appropriate settings for longer periods of time (from 3.5 to 7 years). Service costs vary markedly among county programs with little or no data to justify the wide differences, and few assessments have been made to determine if priorities are being met. To determine why New York has an overabundance of children in foster care, higher than average costs, and longer lengths of time spent in foster care, this report views the target population, program placement, program costs, and preventive and rehabilitative service programs, including Title XX services and other child welfare services and demonstration projects. Numerous recommendations are suggested to improve the foster care system, such as the establishment of a permanent foster care or guardianship program and the development of a statewide social services unit cost and reporting system. Extensive statistical tables and some footnotes are provided.

SHR-0003552 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Use of Income Maintenance Experiment Findings in Public Policy 1977-78.
Henry Aaron, and John Todd. 1978, 23p

The Seattle (Wash.) - Denver (Colo.) Income Maintenance Experiment, the largest and last of 4 income maintenance experiments begun by the Office of Economic Opportunity and DHEW in 1967 - 70, has measured the effect of cash assistance on the work effort of nearly 5,000 low and moderate income families. The experiment found that both one - parent and two - parent families selected alternatives which provided the most income with the least work and that, at certain levels, the income - maintenance payments proved a disincentive to work. This raw data was used in a model to evaluate the impact of Federal welfare reform on proposals on work effort. The Administration's proposal would give assistance to families with children through a public service job or training slot paying the minimum wage, cash assistance, and an Earned Income Tax Credit. The most important finding of this simulation was that if the Federally - supported guarantee approximated benefits in the high - payment States, then no matter what the benefit reduction rate on earnings, the impact on labor supply would be large enough that the decrease in earnings would be a significant fraction of the net increase in benefits. The analysis also showed that the United States already has an income - maintenance proposal, albeit a haphazard one, and analysis is needed to determine its effect on work. Each aspect of the Administration's proposal is described briefly. A series of tables present the simulation findings under various assumptions.

SHR-0003553 PC **A04**/MF **A01**
SRI International, Menlo Park, CA.
Seattle-Denver Income Maintenance Experiment. Mid-Experimental Labor Supply Results and a Generalization to the National Population.
Summary rept.,
Florence Setzer, Richard Kasten, and David Betson. Feb 78, 70p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003553/ES.

To provide information about the work incentive effects of income - conditioned cash transfers, the former Office of Economic Opportunity and the DHEW conducted a series of four social experiments. The last of these experiments, the Seattle - Denver Income Maintenance Experiment, was initiated in 1970 to continue through 1978, providing information about work effort responses that can be applied to the national population and to a variety of possible programs. Nearly 5,000 one - parent and two - parent black, white, and Hispanic - American families were covered in this experiment. The families were assigned either to one of several experimental groups receiving cash assistance payments or to a control group of families which received no experimental payments. Comparison of the hours of work of experimental families with those of control group families during the course of the experiment enabled economists to measure the work disincentives of cash programs on the experimental group. The results from the experiment have been used to simulate the costs, distribution of benefits to different types of families, and work incentive effects resulting from various programs, including the Carter Administration's proposed Program for Better Jobs and Income. In addition, the results of the experiment were used to project the number of jobs needed for President Carter's program and the costs and work incentive effects of combining a jobs program with a cash assistance program. Overall, the results of the simulations show that workers do respond to monetary incentives, but cash assistance programs would not cause a massive withdrawal of workers from the labor force, as has been feared. Any reduction in work effort caused by cash assistance would be more than offset by the increased employment opportunities provided by public service jobs. References and statistical data are provided.

SHR-0003554 PC **A04**/MF **A01**
Office of the Assistant Secretary for Planning and Evaluation (HEW), Washington, DC. Office of Income Security Policy.
Geographic Payment Variation in a Federal Welfare System.
Technical analysis paper no. 14. (Working paper),
Janice Peskin. Jan 77, 75p

Payments to single - parent families under the Aid to Families with Dependent Children (AFDC) Program vary greatly from State to State and sometimes among localities within a single State. Payment levels are set by the States, with the Federal government sharing in the financing. This paper considers whether a reformed welfare system should provide uniform Federal payment levels to all families of similar composition and income or whether payments should vary geographically depending on either the area's specific cost of living or regional income levels. Most Federal tax and transfer payments are uniform across the country, and major past welfare reform proposals have favored uniform payments. However, the National Association of Counties, the Coalition of Northeastern Governors, and the Committee for Economic Development have recently advocated regional variations. This statistical and narrative summary finds that there is a conceptual basis for varying Federal transfer payments according to regional differences in the cost of living, but there are currently no available indices on which variations could be based. Development of such an index would take at least 5 years and perhaps $50 million, while its use would increase administrative costs and complexities. If Federal transfer were based on regional income levels, serious inequities would result among recipients and States. Notes, tables, and references are included.

SHR-0003555 PC **A02**/MF **A01**
Office of the Assistant Secretary for Planning and Evaluation (HEW), Washington, DC.
Income Security System: Purposes, Criteria, and Choices.
Paper no. 2.
1977, 15p
See also related documents, SHR-0003516; SHR-0003556 – SHR-0003558.

The income security system is composed of government interventions in employment activities, government involvement in savings and related activities, and government maintenance of household incomes through social insurance, income assistance programs, and work - conditioned transfers. Particular concerns related to the income security system include the purposes of and criteria used for assessment and the trade - offs implicit in competing objectives. The income security system serves three fundamental purposes -- to provide access to basic goods and services, to soften the impact of unpredictable catastrophic events, and to provide a cushion against a sudden cessation or reduction in income. Motivations for society to engage in the redistribution of income are usually cited as the impulse of humanitarian concern, the desire for income certainty and social stability, to correct unequal opportunity, and the concern over income inequality. These motivations and purposes are changing as the Nation's economic system becomes increasingly interdependent, as persons become increasingly affluent, and as family living patterns change. Although the criteria established for evaluating income security systems may be in conflict with other programs, they are nevertheless indispensible for managing income systems: adequacy, equity, target efficiency, work incentives, employability, self - image, family stability, saving incentives, charity and intra-family transfers, treatment of recipients, administrative efficiency, coherence and control, and clarity and simplicity. The conflicts and trade - offs implicit in these criteria reveal a cross - current of such major policy issues as who would be covered by an income security system, how they should be assisted, how much they should be assured, and what conditions they should meet. Other major issues to be considered are aggregate income redistribution, private sector share of the Gross National Product, stigma and control, relationship to the other social policies, the effect on the aggregate economy, regional fiscal flows, and government fiscal roles.

SHR-0003556 PC **A04**/MF **A01**
Office of the Assistant Secretary for Planning and Evaluation (HEW), Washington, DC.
Low Income Population: What We Know About It. A Statistical Profile.
Paper no. 3.
6 Apr 77, 57p
See also related documents, SHR-0003516; SHR-0003555; SHR-0003557; SHR-0003558.

A series of statistical tables accompanied by a narrative summary gives an overview of the size and composition of the low - income population of the United States, changes in the composition of this population over time, and the role of government transfer programs in assisting low - income persons move out of poverty. The data is based on the Current Population Survey of the Bureau of the Census and the Survey of Income and Education and generally covers the period 1965 - 76. Most of the tables use the official poverty threshold, although a series of comparison statistics show the different picture which emerges under two alternative definitions. (The proportion of officially poor persons has declined from 13.9 to 9.2 percent of the population over the past decade but the share of income going to the poorest 20 percent of families or the proportion of families with income less than half the median income is virtually unchanged.) The statistics also show social welfare expenditures by level of government, per capita social welfare expenditures, characteristics of low - income households (which are disproportionately headed by minority women), and differences in household status before and after transfer payment. The data also trace the continuous flow of people in and out of poverty.

SHR-0003557 PC **A03**/MF **A01**
Office of the Assistant Secretary for Planning and Evaluation (HEW), Washington, DC.
Critical Analysis of the Welfare System.
Paper no. 4.
1977, 33p
See also related documents, SHR-0003516; SHR-0003555; SHR-0003556; SHR-0003558.

The current welfare system frequently fails to provide adequate assistance to low - income families and penalizes families in which both parents are present and working. The Aid to Families with Dependent Children program appears to discourage remarriage and encourage families under economic stress to separate due to a payment policy that will not provide funds for families with working fathers. Most programs have complex rules which make it difficult to calculate the number of exclusions, leading to high error rates and making fraud possible. The first portion of this paper documents these charges with statistics, case histories, and examples. The second section examines various proposals for welfare reform: proponents of the categorical reduction approach would not change the basic system but would improve target efficiency and work incentives; the management approach finds the existing system to be sound, but improved management is essential; proponents of a categorical expansion approach (often referred to as incrementalists) have divergent suggestions, ranging from minor modifications to major overhauls of the system; and finally, other groups propose major restructuring of the welfare system, the type of restructuring depending upon the policy advocated. The advantages and disadvantages of each proposal are summarized. Footnotes contain additional data and references.

SHR-0003558 PC **A05**/MF **A01**
Office of the Assistant Secretary for Planning and Evaluation (HEW), Washington, DC.
Leading Welfare Reform Options.
Paper no. 5.
25 Apr 77, 85p
See also related documents, SHR-0003516; SHR-0003555 -- SHR-0003557. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003558/ES.

Four alternatives for reforming the welfare system are identified and analyzed. The options are selected on the basis of information gathered at public hearings, and meetings with Government officials and members of the Welfare Reform Consulting Group. Each alternative is considered in terms of broad policy objectives and specific char-

acteristics, estimated cost and caseload size, estimated aggregate fiscal relief available to States, and comparative advantages when evaluated alongside the present welfare system. The first alternative, multiple program strategy, involves small - scale refundable tax credits, minor revisions to social security and Aid to Families with Dependent Children (AFDC) regulations, removal of the purchase requirement and other stipulations in food stamps, and the introduction of a housing allowance program to parallel food stamps. The next option, guaranteed jobs with cash assistance, would provide a public sector job to nuclear family units with children and a member expected - to - work; cash assistance would be provided through a federalized AFDC program with no - member - expected - to - work families. This approach stresses work incentives. Third, the provision of income assistance to families and individuals without regard to family composition in order to make the transfer system more equitable is the major feature of the program consolidated cash assistance with jobs. A federally - funded public service jobs component would furnish employment for members of recipient households with a member expected - to - work. The final approach, the triple - track, involves tax reform for the working poor, placement assistance for a private sector job for expected - to - work family members, and income maintenance for families with no member expected - to - work. Several other appraches not selected among the four most viable are described briefly, including management improvements, small incrementalism, current system reduction and the block - grant approach. Appendices display technical details of the options, discuss the Department of Agriculture proposals for revisions in the Food Stamp Program, and examine several proposals from which the components of the select four were taken.

SHR-0003587 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Inst. for Research on Poverty.
Reappraisal of Negative Income Tax and Employment-Subsidy Approaches to Reforming Welfare.
Robert I. Lerman. Dec 76, 18p
Previous draft of this paper presented at the Income Maintenance Session of the American Economic Association Meetings, Atlantic City, New Jersey, Sept. 16-18, 1976.

This paper reappraises the Negative Income Tax (NIT) and unemployment - subsidy approaches to welfare reform. There is a growing recognition that job - guarantee programs command more popular support than income - guarantee programs. In a 1972 national poll, 72 percent of the respondents favored a guaranteed job plan, while only 38 percent favored a guaranteed income plan. Given the political difficulties associated with undertaking grand reforms and improvements in the current system, some analysts now favor an incrementalist strategy. They argue that relatively minor changes in the food stamp and AFDC (Aid to Families with Dependent Children) programs and adoption of national health insurance would bring about a reasonable NIT - oriented transfer system. But opponents of this strategy cite the current system's high administrative costs, horizontal inequities, and excessive complexity, and continue to press for a complete overhaul. Whereas the case for a complete overhaul remains strong, the NIT strategy has become questionable. New drawbacks to NIT include the following: the increasing extent of income - conditioning has made the cumulative tax rate problem more serious; a generous NIT with a 50 percent or higher tax rate might raise unemployment by worsening the inflation - unemployment tradeoff in a manner similar to the effects of unemployment insurance; and planned NIT income guarantees are inequitable in according similar treatment to 1 - parent and 2 - parent families. Therefore, an unemployment subsidy (ES) approach has become more attractive. For instance, the program JOIN (jobs and income plan) would offer one special public job or a wage subsidy in another job to every family or single individual. The public job wage would be slightly above the minimum wage, with JOIN's income component applying only to 1 - parent families with children under 14 years. These families also could receive a cash grant. The introduction of JOIN would coincide with the recommended shift from personal deductions to refundable credits. Other advantages of this program are detailed. In 1975, if this program had been in effect, a family of 4 would have been assured a guaranteed income of $4,600 for a net budget cost of $9 billion. Tabular data and references are included.

SHR-0003672 PC **A03**/MF **A01**
Social Security Administration, Washington, DC. Welfare Management Inst.
Hidden Agenda: Content and Nature of the Income Maintenance (IM) Worker's Job.
Evelyn L. Greene. 1979, 39p DHEW/PUB/SSA-79-08006

As part of the effort by the Office of Family Assistance to assist State agencies in reviewing and improving their administrative practices, this paper attempts to clarify the nature of the income maintenance worker's (or eligibility worker's) function. Eligibility workers are the State or local agency employees who are responsible for determining which families are eligible for financial assistance under Aid to Families with Dependent Children (AFDC). An income maintenance (IM) worker may be responsible for approximately 150 families, which represents expenditures of $36,610 per month and $463,320 per year. To provide background information as a basis for reexamining the IM worker's job, this paper discusses the sources used to collect data and study the IM worker's position, three selected elements of the job (information processing, the client, the work environment), the use of a conceptual framework for viewing and analyzing the job, requirements of the position (knowledge, skills, values, and attitudes), and preparation for the job. The sources of information about the IM worker's job include position descriptions from 34 States, a critique session with a selected group of IM workers and supervisors, the income maintenance tasks in the National Task Bank (containing about 1,100 individual tasks performed by public welfare service deliverers), a position classification study, and a job analysis survey. Appendices contain job descriptions of the eligibility technician I and the financial worker I, a discussion guide, a summary of the eligibility worker's role, questions for discussion, references, and related material. Some footnotes are included.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A088 257/1 PC **A02**/MF **A01**
Letterman Army Inst of Research San Francisco CA
Purification of Transketolase from Human Erythrocytes. 1. Using Solvent Denaturation as the Initial Step.
Technical note. Oct 79-Feb 80,
Michael H. Dong, Evelyn L. McGown, Paul P. Waring, James H. Skala, and Howerde E. Sauberlich. Jul 80, 15p Rept no. LAIR-TN-13

An attempt was made to purify human erythrocyte transketolase (EC 2.2.1.1) by the use of solvent denaturation as the initial isolation step. This involved the use of 95% ethanol solution (-20 C) to denature a large amount of the hemoglobin and other non-transketolase proteins. Although the data obtained from this study did not contribute to sound statistical values because of the small sample size, they tended to support the application of the method as an effective initial step in the purification of human erythrocyte transketolase. The mean recovery of the enzyme for five trials conducted with blood obtained from three donors was 61 + or - 3%. The purification ranged from 21 to 23. The method permitted the removal of nearly 95% of the hemoglobin initially present. (Author)

BNL-27860 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Role of pi -Cation Radicals in the Enzymatic Cycles of Peroxidases, Catalases, and Nitrite and Sulfite Reductases.
L. K. Hanson, C. K. Chang, M. S. Davis, and J. Fajer. 1980, 22p CONF-800490-1
Contract AC02-76CH00016
Symposium on interaction between iron and proteins in oxygen and electron transport, Airlie House, VA, USA, 13 Apr 1980.

Charge iterative extended Hueckel calculations, and magnetic and optical results on porphyrins, chlorins, and isobacteriochlorins (1) suggest that the catalytic cycles of the enzymes horseradish peroxidase, catalase, Neurospora crassa catalase, and nitrite and sulfite reductases proceed via pi - cation radicals of their prosthetic groups; (2) offer distinguishing features for the optical and magnetic spectra of these radicals, pertinent to their detection as enzymatic intermediates; (3) reconcile the seemingly contradictory optical and NMR data on Compounds I of horseradish peroxidase; and (4) predict that the axial ligation of the heme differs for horseradish peroxidase and catalase. (ERA citation 05:031171)

BNL-28027 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Report on Picosecond Studies of Electron Transfer in Photosynthetic Models.
T. L. Netzel, R. R. Bucks, S. G. Boxer, and I. Fujita. 1980, 5p CONF-800656-2
Contract AC02-76CH00016
Picosecond meeting, Falmouth, MA, USA, 18 Jun 1980.

Considerable spectroscopic work on reaction centers 8RC) from photosynthetic bacteria and on photosystem I (PSI) particles from green plants has established that the initial photochemical step in these systems is the subnanosecond tranfer of an electron resulting in the creation of an oxidized donor and a reduced acceptor. For both of these systems the electron donor is a dimer. The acceptor for bacterial RC's is bacteriopheophytin, a metal-free bacteriochlorophyll. The acceptor for PSI is thought to be chlorophyll/sub a/. Dimeric and trimeric model molecules containing PChl/sub a/ were studied. However, rather than relying on chemical equilibria to join the potential electron donors and acceptors, we covalently attached all of the subunits to form a single large molecule. The distance was altered between the donor and acceptor subunits by using both 10 atom and 5 atom chains. Also, the effects of altering the relative orientation of the donor and acceptor were probed by contrasting the kinetics observed with added pyridine too those observed with added alcohol. The addition of pyridine prevents the dimer and trimer models from aggregating. However, the addition of alcohol causes intramolecular bonding of the model's subunits though R-OH bridges. Because the dielectric constant (epsilon) of the solvent directly affects the kinetics of electron transfer reactions, several solvents were used: toluene, CH sub 2 Cl sub 2 , and CH sub 3 CN. Also, since a goal of this type of research is to correlate electrochemical, spectroscopic and structural information to predict the likelihood of electron transfer reactions, we varied the redox span of the potential photoproducts. (ERA citation 05:031172)

BNL-28040 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Autoxidation and Cytotoxicity.
D. C. Borg, K. M. Schaich, and J. J. Elmore, Jr. 1980, 14p CONF-800591-2
Contract AC02-76CH00016
International conference on oxygen and oxy-radicals in chemistry and biology, Austin, TX, USA, 26 May 1980.

A comprehensive synthesis, or reaction schema, to relate autoxidations of non-lipid compounds to lipid chain peroxidation in vivo is presented. This is done in the context of cytotoxic autoxidation reactions, and it is concluded that hydroxyl radicals produced by iron-dependent Fenton reactions

serve as both primary toxicants and as sources of secondary toxicants. The latter stem from lipid chain peroxidation initiated by the Fenton-derived hydroxyl radicals, which are visualized as the obligate coupling step linking enzyme-dependent and non-enzymic autoxidations to potentially toxic outcomes. (ERA citation 05:031173)

CONF-791059-7 PC **A02**/MF **A01**
Tennessee Univ., Oak Ridge. Graduate School of Biomedical Sciences.
Binding of B(a)P Diol Epoxide to Chromosomal Histone Proteins.
A. Kootstra, M. C. Cronen, and T. J. Slaga. 1979, 20p
Contract W-7405-ENG-26
International symposium on polynuclear aromatic hydrocarbons, Columbus, OH, USA, 2 Oct 1979.

In order to understand how a chemical such as benzo(a)pyrene (B(a)P) exerts its carcinogenic effect, a fundamental knowledge is required concerning the interaction of metabolites of B(a)P with the macromolecules of the eukaryotic cell and the consequences of such interaction at the molecular level. Since current evidence suggests that the DNA is an important target of the ultimate carcinogenic form of B(a)P, the B(a)P diol epoxide, we have studied the binding of B(a)P diol epoxide (anti) to chromatin in vitro, in order to obtain some information about the interaction of this carcinogen with the various components of chromatin. (ERA citation 05:031183)

IAEA-R-2019-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Effect of Estrogen Administration on the Level of Various Binding Proteins in Animal Plasma and Their Use in Radioassays. Final Report for the Period 1 July 1977 - 30 June 1979.
J. D. Maontzos. Jul 79, 7p
U.S. Sales Only.

The possibility of using animal serum as a source of thyroxine binding proteins in the radioassay of thyroxine was investigated. The results of experimental studies showed that the human and animal sera treated with merthiolate, ANS, salicylate, diphenylhydantoin, chlorpromazine, trifluoroperazine, phenylbutazone, and urea behave in different ways. For example, merthiolate in a concentration of 1.73 x 10 exp -3 M reduced the thyroxine binding capacity of human serum by 2.4% and of sheep serum by 17.5% of their original level. Knowing that, it was possible to prepare a standard curve using sheep serum with increasing quantities of thyroxine. It was also observed that urea in various concentrations and pH values caused irreversible denaturation of human serum thyroxine binding proteins and this denaturation could be controlled. On the basis of this finding it was possible to develop a normalized thyroxine assay in which no extraction step is needed. (Atomindex citation 11:508503)

6C. Biology

AD-A088 144/1 MF **A01**
Johns Hopkins Univ Baltimore MD Dept of Pathobiology
Metabolism and Nutrition of Bering Sea Harbor and Spotted Seals.
Technical rept.,
S. Ashwell-Erickson, R. Elsner, and D. Wartzok.
1979, 19p Rept no. TR-20
Contract N00014-75-C-0701, Grant PHS-HL-16020
Pub. in Proceedings of the Alaska Science Conference (29th), Aug 79.
Availability: Microfiche copies only.

No abstract available.

AD-A088 462/7 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Neurodynamic Response Analysis of Anterior Semicircular Canal Afferents in the Pigeon.
Research paper,
Jack P. Landolt, and Manning J. Correia. 8 Feb 79, 25p Rept no. DCIEM-RP-79-X-7
Prepared in cooperation with Texas Univ. Medical Branch at Galveston.
Availability: Pub. in Jnl. of Neurophysiology, v43 n6 p1746-1770 Jun 80 (No copies furnished by DTIC/NTIS).

No abstract available.

BNL-27923 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Haemophilus Influenzae Does Not Fit Theories of Postreplication Repair.
J. K. Setlow, and N. K. Notani. 1980, 5p
Contract AC02-76CH00016

Studies with Escherichia coli have provided all the initial insights into the molecular bases of repair processes. It is the thesis of this article that especially if we believe that there are some general mechanisms in nature, it is important to consider more than one microorganism in arriving at an understanding of the biology of repair of DNA. (ERA citation 05:029715)

BNL-28042 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Movable Genetic Elements: Detection of Changes in Maize DNA at the Shrunken Locus Due to the Intervention of Ds Elements.
B. Burr, and F. A. Burr. 1980, 7p CONF-800595-1
Contract AC02-76CH00016
Cold Spring Harbor symposium No. 45: movable genetic elements, Cold Spring Harbor, NY, USA, 28 May 1980.

This report describes our initial attempts at the molecular characterization of a maize controlling element. We have prepared a cDNA probe and used it to detect changes at a locus where Ds elements are found. Evidence of their presence are indicated by changes in the restriction patterns, but there is as yet no information on the physical nature of the controlling elements nor on the kinds of rearrangements they cause. (ERA citation 05:031191)

DOE/ER/03326-90 PC **A02**/MF **A01**
Martin Marietta Labs., Baltimore, MD.
Photochemistry and Enzymology of Photosynthesis. Progress Report, November 1, 1979-March 31, 1980.
R. Radmer, J. Golbeck, and B. Velthuys. Apr 80, 11p
Contract AC02-76ER03326

Progress is reported for the period November 1979 through March 1980. Specific projects reported on are: (1) light harvesting and electron transport in C sub 4 plants; (2) mass spectrometer studies of photosynthetic O sub 2 evolution; (3) biochemical studies on chloroplast copper proteins; and (4) electron transport in green plants. (ERA citation 05:031184)

DOE/EV/01322-132 PC **A14**/MF **A01**
Minnesota Univ., Minneapolis.
Vertebrate Behavior and Ecology. Progress Report, July 1, 1977-May 31, 1980.
J. R. Tester, and D. B. Siniff. Jun 80, 324p
Contract AS02-76EV01332

Engineering design and development concentrated on five aspects during the past year: (1) development of high power output transmitters for monitoring animals from greater distances; (2) improvement and updating of a sonic transmitting and receiving system for monitoring fish and marine mammals; (3) design and testing of corrosive links which permit a transmitter to release from an animal at a specified time; (4) development of high frequency transmitters; and (5) development and testing of time delay transmitters. Field efforts resulted in further information on activity patterns and movements of sea otters in California and Alaska and of walleye pike in experimental channels. Three manuscripts and two theses presented as part of this report describe these aspects in detail. (ERA citation 05:031169)

DP-MS-79-111 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Cesium-137 in Deer: Savannah River Plant Vs. Southeastern Coastal Plain Herds.
J. R. Watts, E. W. Rabon, and A. S. Dicks. 1979, 17p CONF-800731-1
Contract AC09-76SR00001
Health Physics Society meeting, Seattle, WA, USA, 20 Jul 1980.

The exp 137 Cs content in deer killed during programmed hunts at the Savannah River Plant (SRP) has averaged 9.0 pCi/g. This value, based on measurements of 13,907 deer taken over 14 years (1965 to 1978), similar to the value obtained for 552 deer from other southeastern Coastal Plain locations, indicating the exp 137 Cs content is due to fallout from the atmospheric testing of nuclear weapons rather than from SRP operations. The computerized SRP data base for each harvested deer includes age, sex, weight, cesium content, kill location, date, and the hunter's name. Analysis of these data enables the estimation of population dose from ingestion of the edible meat. Consumption of all edible meat from deer killed at SRP from 1965 to 1978 gives a whole body population dose of 196 man-rem from exp 137 Cs. Assuming an annual consumption rate of 20 kg gives an average individual whole body dose of 13 mrem, about 10% of local annual background level. The radiation dose from exp 40 K of natural potassium content of deer is comparable to the radiation dose from exp 137 Cs. (ERA citation 05:029721)

EPRI-EA-1402(V.1) PC **A17**/MF **A01**
Lawler, Matusky and Skelly Engineers, Pearl River, NY.
Methodology for Assessing Population and Ecosystem Level Effects Related to Intake of Cooling Waters. Volume 1. Handbook of Methods: Population Level Techniques. Final Report.
R. A. Alevras, C. B. Dew, E. K. Pikitch, R. L. Wyman, and J. P. Lawler. Jun 80, 400p

Various techniques related to assessing power-plant-induced mortality at the population level are presented. A broad range of techniques is presented through a review of past experience, examples using real or simulated data from power plant studies and new techniques developed for this methodology. The detailed information needed by an investigator to select those techniques most appropriate for the assessment problem at hand is provided. Guidance is provided for the interpretation of the results of various analyses where appropriate. The major subjects reviewed include techniques for estimating entrainment and impingement mortality, techniques for estimating population size, hydrologically based models for assessment, the use of length data for assessment, the Leslie Matrix Model, population response analysis, including a computer program for reproductive value, stock-recruitment relationships and life cycle models. (ERA citation 05:031222)

EPRI-EA-1402(V.2) PC **A14**/MF **A01**
Lawler, Matusky and Skelly Engineers, Pearl River, NY.
Methodology for Assessing Population and Ecosystem Level Effects Related to Intake of Cooling Waters. Volume 2. Handbook of Methods Community Analysis Techniques. Final Report.
D. T. Logan, S. S. Moy, R. A. Norris, and W. J. Sydor. Jun 80, 318p

Techniques of community analysis applicable to assessment of biological changes resulting from cooling water withdrawal are presented. Four general areas are considered; stability, diversity, and niche theory; patterns in distance and time; ecological simulation modeling; and other approaches. The two former areas are judged the most useful and are reviewed in depth, from historical development and basic principles through increasingly complex and demanding methods. Several computer programs with example output are provided. Guidance is given for effective experimental design, choice of appropriate technique of analysis, application, and interpretation. For single utilities, thoughtfully designed experimental and monitoring programs and thorough analysis of empirical data are recommended. Ecological simulation modeling should be reserved for large, multiple-impact situations and should be used to direct, integrate and guide study programs. (ERA citation 05:031223)

LA-8245-PR PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Automated Cancer-Cell Sorting and Analysis. Midyear Progress Report, June-December 1979.
P. F. Mullaney, J. C. Martin, J. Steinkamp, and Z. Svitra. Jul 80, 15p
Contract W-7405-ENG-36

This report covers the work performed under Interagency Agreement N01 60311 from June through December 1979. The LASL dual-laser cell sorter has been evaluated with CHO, Colo, and CaSki cells stained with mithramycin and two protein stains. All the deliverables called for in this program have been completed and are awaiting shipment to NCI. The computerization of this sorter is in progress, and some refabrication of the parabolic chamber is required before evaluation can be completed. Plans for the second 6-month portion of the program are also discussed. (ERA citation 05:031188)

NP-24450 PC **A05**/MF **A01**
Syncrude Canada Ltd., Edmonton (Alberta).
Fisheries Survey of the Beaver Creek Diversion System, 1978.
J. P. O'Neil. Jun 79, 89p
U.S. Sales Only.

On three occasions during the period May through October 1978, fish sampling was conducted in the Beaver Creek Diversion System. These efforts were oriented towards providing an inventory of post-diversion fish populations. The study was designed not only to update the existing data base, but to provide quantified and reproducible catch/unit effort data (CUE) which could effectively serve as a basis for future monitoring of fish populations. Sampling gear employed in the study included gill nets, beach seine, and back-pack electrofisher. While the total of 11 species were encountered in the study area, only 6 were recorded in the upper diversion system (i.e., upstream of the Poplar Creek dam). Included in this latter group were two species of catostomids (white sucker, longnose sucker), the fathead minnow, brook stickleback, lake chub and spoonhead sculpin (Upper Beaver Creek only). Species collected in Poplar Creek, additional to those recorded in the upper diversion system, were Arctic grayling, northern pike, yellow perch, burbot and trout-perch. The spoonhead sculpin was not collected in Poplar Creek. Pertinent life history information was collected for each of the species in the study area and subsequently analyzed by computer. This material is provided in a separate data volume. Because of the significance of the white sucker in the diversion system, life history data for this species are presented in this report. (ERA citation 05:031154)

PB80-226749 PC **A15**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Fishery Bulletin. Volume 77, Number 4, 1980.
1980, 327p NOAA-80080501
See also Volume 77, Number 3, PB80-161920.

This issue of the Fishery Bulletin contains the following articles: Revision of the penaeid shrimp genus Penaeopsis (Crustacea: Decapoda); Likelihood methods for the von Bertalanffy growth curve; Vertical distribution and development of larval fishes in the North Pacific central gyre during summer; Resistance of different stocks and transferrin genotypes of coho salmon and steelhead trout to bacterial kidney disease and vibriosis; Remarks on systematics, development, and distribution of the hatchetfish; Behavior of the Hawaiian spinner dolphin; Larval development of Hypoconcha sabulosa (Decapoda: Dromiidae); Black rockfish changes in physical, chemical, and sensory properties when held in ice and in carbon dioxide modified refrigerated seawater; Behavior and ecology of the dusky dolphin in the South Atlantic; Growth and survival in newly settled spat of the Manila clam; Development and occurrence of larvae and juveniles of the rockfishes off Oregon; Effects of trap venting on gear selectivity in the inshore Rhode Island Americal lobster; Acoustic measurements of a migrating layer of the Mexican lampfish at 102 kilohertz; Embryonic development of Atlantic menhaden and a fish embryo estimation method; Distribution and movements of Risso's dolphin in the eastern North Pacific; and others.

PB80-226764
(Order as PB80-226749, PC **A15**/MF **A01**)
Washington State Dept. of Fisheries, Olympia.
Likelihood Methods for the von Bertalanffy Growth Curve,
Daniel K. Kimura. Jul 79, 11p NOAA-80080501-2
Included in Fishery Bulletin, v77 n4 p765-776, 1980.

Likelihood methods for the von Bertalanffy growth curve are examined under the assumption of independent, normally distributed errors. The following are examined: determining the best method of estimation, relationships between methods of estimation, failure of assumptions, constructing confidence regions, and applying likelihood ratio tests.

PB80-226772
(Order as PB80-226749, PC **A15**/MF **A01**)
Scripps Institution of Oceanography, La Jolla, CA.
Vertical Distribution and Development of Larval Fishes in the North Pacific Central Gyre during Summer,
Valerie J. Loeb. May 79, 16p NOAA-80080501-3
Included in Fishery Bulletin, v77 n4 p777-793 1980.

Abundance data are presented on the mesopelagic fish larvae taken in 60 opening/closing bongo net samples from the North Pacific central gyre in late summer. Vertical abundance and size-depth distributions are described for 43 species of gonostomatids and myctophids and two sternoptychid genera. Developmental stages at which these fishes leave the surface layers (either moving deeper or beginning extensive vertical migration) are estimated from sizes of captured larvae. Over 96% of the estimated larval water column abundance occurred within the upper 100 m. Maximum abundance and diversity were at 25-50 m, possibly related to the bottom of the seasonal mixed layer.

PB80-226780
(Order as PB80-226749, PC **A15**/MF **A01**)
Oregon State Univ., Corvallis. Agricultural Experiment Station.
Resistance of Different Stocks and Transferrin Genotypes of Coho Salmon, 'Oncorhynchus kisutch', and Steelhead Trout, 'Salmo gairdneri' to Bacterial Kidney Disease and Vibriosis,
Gary W. Winter, Carl B. Schreck, and John D. McIntyre. May 79, 7p TECHNICAL PAPER-4862, NOAA-80080501-4
Included in Fishery Bulletin, v77 n4 p795-802 1980.

Juvenile coho salmon and steelhead trout of different stocks and three transferrin genotypes (AA, AC, and CC), all reared in identical or similar environments, were experimentally infected with Corynebacterium sp., the causative agent of bacterial kidney disease, or with Vibrio anguillarum, the causative agent of vibriosis. Mortality due to the pathogens was compared among stocks within a species and among transferrin genotypes within a stock to determine whether there was a genetic basis for resistance to disease. Differences in resistance to bacterial kidney disease among coho salmon stocks had a genetic basis.

PB80-226863
(Order as PB80-226749, PC **A15**/MF **A01**)
Rhode Island Dept. of Environmental Management, Wickford. Div. of Fish and Wildlife.
Effects of Trap Venting on Gear Selectivity in the Inshore Rhode Island American Lobster, 'Homarus americanus', Fishery,
Michael J. Fogarty, and David V. D. Borden. Apr 79, 8p NOAA-80080501-12
Included in Fishery Bulletin, v77 n4 p925-933 1980.

The incorporation of escapement devices in lobster traps has proven effective in allowing the release of sublegal-sized American lobster, Homarus americanus, and reducing the potential for trap related injury and mortality. The present study was undertaken to assess the effects of trap venting on size selectivity and catch per unit effort in the inshore Rhode Island lobster fishery. The use of rectangular vents resulted in a 79% decrease in the sublegal catch. Vented traps tended to consistently catch greater numbers of legal-sized lobster, possibly due to a density dependent effect.

PB80-226913
(Order as PB80-226749, PC **A15**/MF **A01**)
California Univ., Santa Barbara. Dept. of Biological Sciences.
Isolation of Olive Rockfish, 'Sebastes serranoides', Populations Off Southern California,
Milton S. Love. May 79, 8p NOAA-80080501-17
Included in Fishery Bulletin, v77 n4 p975-983 1980.

Movements of the olive rockfish, Sebastes serranoides, off Santa Barbara, California, were investigated, using mechanical and parasite tags.

PB80-851199 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Anthropometry. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Aug 80, 58p NERACEI NT0448
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations presented in this bibliography cover models to predict some anthropometric, biomechanical and work physiology parameters from age, height, and weight. Recommendations and improvements for the human operator for maximal performance and safety are also included in this bibliography. (Contains 052 citations.)

PB80-854763 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Anthropometry. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Thomas H. Jones. Jun 80, 114p
NERACIAANT0448
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations presented in this bibliography cover a set of predictive equations to calculate important anthropometric, biomechanical parameters pertaining to human performance. Recent advances in analysis methods, devices and techniques for measurement of human biomechanical activity and theoretical research into the applicability of analytical mechanics to human motion problems, optimal performance of human motion and optimal modeling for particular human motion. Works in progress are also included. (Contains 098 citations.)

PB80-854771 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plant Genetics. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 139p
NERACUSGNT0556
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover world-wide literature on plant genetics, reproduction, diseases and insect control. Studies include yield improvement for forest and food crops from the standpoint of selection, climatology, soils germination and vulnerability to stresses. Some abstracts report on economic and demand factors. (Contains 116 citations.)

PB80-854789 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plant Diseases. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 211p
NERACUSGNT0557
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers extensive literature on plant diseases and disease-resistant strains.

Some reports cover the environmental impact of pollution on various plants. The abstracts report on techniques or chemicals to resist disease, through plant breeding or mutations, control of insect infestation, studies of infection process and identification of defects in plants or soils. (Contains 175 citations.)

PB80-854797 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plant Diseases. July, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jul 76-May 80,
Thomas H. Jones. Jun 80, 152p
NERACEDBNT0557
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers extensive literature on plant diseases and disease-resistant strains. Some reports cover the environmental impact of pollution on various plants. The abstracts report on techniques or chemicals to resist disease, through plant breeding or mutations, control of insect infestation, studies of infection process and identification of defects in plants or soils. (Contains 122 citations.)

SGAE-2895 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Influence of Some Prostaglandins on DNA Synthesis and DNA Excision Repair in Mouse Spleen Cells in Vitro.
W. Klein, H. Altmann, F. Kocsis, D. Egg, and R. Guenther. Mar 78, 9p BL-221/78
U.S. Sales Only.

In vitro experiments were performed on mouse spleen cells to establish possible influences of some naturally occurring prostaglandins on DNA synthesis and DNA excision repair. The prostaglandins A sub 1 , B sub 1 , E sub 1 , E sub 2 and Fsub(2 alpha) were tested in concentrations of 10 pg, 5 ng and 2,5 mu g per ml cell suspension. DNA synthesis was significantly increased by PgFsub(2 alpha) in all the three concentrations tested, while the other tested prostaglandins were essentially ineffective. DNA excision repair was significantly inhibited by PgE sub 1 and PgE sub 2 at 5 ng/ml and at 2,5 mu g/ml but increased by PgFsub(2 alpha) in the two lower concentrations. The rejoining of DNA-strand breaks after gamma-irradiation was slightly reduced by PgE sub 1 , PgE sub 2 and PgF sub 2 at 2,5 mu g/ml. (Atomindex citation 11:508280)

SRO-1015-T3 PC **A02**/MF **A01**
Georgia Univ., Athens. School of Forest Resources.
Literature Guide for Plant Tissue Culture.
H. E. Sommer. 1979, 22p
Contract EG-77-S-09-1015

This guide to plant tissue culture literature provides the investigator with references to aid in deciding if tissue culture methods are applicable to his problem and provides an introduction to the methods of plant tissue culture and the results obtained. Only a small portion of the literature is covered in this guide, and is not intended as a substitute for a literature search. For the purpose of this guide we have interpreted tissue culture to include cell, callus, organ, embryo, and protoplast culture. We have to include references useful for developmental biology, plant breeding, plant propagation, plant physiology and biochemistry. (ERA citation 05:031174)

UCRL-84292 PC **A02**/MF **A01**
California Univ., San Francisco. Howard Hughes Medical Inst. Lab.
Structure, Evolution and Expression of Insulin Genes.
B. Cordell, R. V. Lebo, L. C. Yu, Y. F. Lau, and A. V. Carrano. 1980, 5p CONF-800233-1
Contract W-7405-ENG-48
International congress on endocrinology, Melbourne, Australia, 10 Feb 1980.

Since the initial discovery of insulin by Banting and Best in 1922 enoromous progress has been made in understanding the role of this hormone in the control of diabetes and in regulating glucose homeostasis in vertebrates. However, until very recently, little was known abut the structure of the insulin genes or the control of insulin gene expression in the normal and pathological state. We have been studying the structure of the rat and human genes encoding preproinsulin and the chromosomal location of the human gene. In addition, we have reintroduced the isolated insulin genes into mammalian cells growning in culture in order to study the molecular events associated with insulin expression. A summary of our recent findings is reported here. (ERA citation 05:031192)

6D. Bionics

N80-30086/6 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Machine Intelligence and Robotics: Report of the NASA Study Group. Executive Summary.
Sep 79, 23p NASA-CR-163380, JPL-730-51

A brief overview of applications of machine intelligence and robotics in the space program is given. These space exploration robots, global service robots to collect data for public service use on soil conditions, sea states, global crop conditions, weather, geology, disasters, etc., from Earth orbit, space industrialization and processing technologies, and construction of large structures in space. Program options for research, advanced development, and implementation of machine intelligence and robot technology for use in program planning are discussed. A vigorous and long-range program to incorporate and keep pace with state of the art developments in computer technology, both in spaceborne and ground-based computer systems is recommended.

6E. Clinical Medicine

AD-A087 616/9 PC **A02**/MF **A01**
Boston Univ MA School of Medicine
Antibody Inhibition of Polymorphonuclear Phagocytosis.
James P. Crowley, and C. Robert Valeri. 30 Jan 80, 12p
Contract N00014-79-C-0168
Prepared in cooperation with Brown Univ., Providence, RI., Grant PHS-CA-13943-04. Pub. in Jnl. of Laboratory and Clinical Medicine, v95 n6 p868-876 Jun 80.

No abstract available.

AD-A087 956/9 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Liposomes in Leishmaniasis: Therapeutic Effects of Antimonial Drugs, 8-Aminoquinolines, and Tetracycline.
Carl R. Alving, Edgar A. Steck, Willie L. Chapman, Jr., Virginia B. Waits, and Larry D. Hendricks. 21 Apr 80, 9p
Pub. in Life Sciences, v26 n26 p2231-2238 1980.

No abstract available.

AD-A087 963/5 PC **A02**/MF **A01**
Ohio State Univ Research Foundation Columbus
Isolation and Characterization of Plasmodial and Babesial Antigens.
Final technical rept. 1 Dec 71-30 Jun 78,
Julius P. Kreier. 20 May 80, 14p Rept no. OSURF-783365/760068
Contract DADA17-72-C-2072

The continuous flow sonic system developed in this laboratory and various other methods for freeing malaria parasites from their host erythrocytes were evaluated from the standpoint of the morphological integrity of the freed parasites and the utility of the freed parasites as sources of antigen for immune and serological tests. Our attempts to identify which antigens are protective by immunization have demonstrated that a soluble component of Plasmodium berghei is significant in inducing immunity, and we have tentatively identified this soluble component as surface coat material. Thus our work on identification of protection stimulating antigens in Plasmodium berghei has been successful. The knowledge obtained from these studies must now be applied to development of a vaccine against malaria of man. (Author)

AD-A087 964/3 PC **A02**/MF **A01**
Naval Medical Research Unit No 2 APO San Francisco 96528
Antigenic Analyses of Two Axenized Strains of Entamoeba histolytica by Two-Dimensional Immunoelectrophoresis.
Technical rept.,
Shu Mei Chang, Chun Mei Lin, Donald G. Dusanic, and John H. Cross. 17 Mar 79, 13p Rept no. NAMRU-2-TR-832
Pub. in the American Jnl. of Tropical Medicine and Hygiene, v28 n5 p845-853 1979.

No abstract available.

AD-A087 965/0 PC **A02**/MF **A01**
Naval Medical Research Unit No 2 APO San Francisco 96528
Variation in Susceptibility to Oral Infection with Dengue Viruses among Geographic Strains of Aedes aegypti.
Technical rept.,
D. J. Gubler, S. Nalim, R. Tan, H. Saipan, and J. Sulianti Saroso. 25 Nov 78, 12p Rept no. NAMRU-2-TR-833
Pub. in American Jnl. of Tropical Medicine and Hygiene, v28 n6 p1045-1052 1979.

No abstract available.

AD-A087 966/8 PC **A02**/MF **A01**
Naval Medical Research Unit No 2 APO San Francisco 96528
Search for Enterotoxigenic Escherichia coli in the Environment in Taipei, Taiwan.
Technical rept.,
Peter Echeverria, Yung-Lu Lin, Chao-Hung Lee, Lucky Verhaert, and Robert Ewing. 20 Dec 78, 6p Rept no. NAMRU-2-TR-834
Pub. in Chinese Jnl. of Microbiology, v11 p138-140 1978.

No abstract available.

AD-A087 968/4 PC **A02**/MF **A01**
Naval Medical Research Unit No 2 APO San Francisco 96528
Correlations between HBeAg/Anti-HBe, HBsAg Titer, HBsAg-Associated Albumin Binding Sites and Infectivity.
Technical rept.,
Cladd E. Stevens, A. Robert Neurath, Wolf Szmuness, R. Palmer Beasley, and Hafeez Ikram. 1978, 9p Rept no. NAMRU-2-TR-836
Pub. in Viral Hepatitis, p211-216 1978. Proceedings of the Symposium of Viral Hepatitis (2nd), 16-19 Mar 78, San Francisco, CA.

No abstract available.

AD-A087 969/2 PC **A02**/MF **A01**
Naval Medical Research Unit No 2 APO San Francisco 96528
Vertical Transmission of HBV and Interruption with Globulin.
Technical rept.,
R. Palmer Beasley, and Cladd E. Stevens. 1978, 17p Rept no. NAMRU-2-TR-837
Pub. in Viral Hepatitis, p333-345 1978. Proceedings of the Symposium on Viral Hepatitis (2nd), 16-19 Mar 78, San Francisco, CA.

No abstract available.

AD-A087 970/0 PC **A02**/MF **A01**
Naval Medical Research Unit No 2 APO San Francisco 96528
Dengue Virus Isolation in Indonesia, 1975-1978.
Technical rept.,
W. Suharyono, D. J. Gubler, I. Lubis, R. Tan, and M. Abidin. 1979, 8p Rept no. NAMRU-2-TR-838
Pub. in Asian Jnl. of Infectious Diseases, v3 p27-32 1979.

No abstract available.

AD-A087 971/8 PC **A02**/MF **A01**
Naval Medical Research Unit No 2 APO San Francisco 96528
Serological Response to Immunization with Influenza Vaccine among United States Marine Corps Personnel.
Technical rept.,
James G. Olson, and George S. Irving. 1979, 6p Rept no. NAMRU-2-TR-839
Pub. in Military Medicine, v145 n2 p93-95 Feb 80.

No abstract available.

AD-A087 972/6 PC **A02**/MF **A01**
Naval Medical Research Unit No 2 APO San Francisco 96528
An Explosive Outbreak of Influenza Caused by A/USSR/77-Like Virus on a United States Naval Ship.
Technical rept.,
James G. Olson, Thomas G. Ksiazek, George S. Iving, and Robert W. Rendin. 1979, 7p Rept no. NAMRU-2-TR-840
Pub. in the Military Medicine, v144 n11 p743-745 Nov 79.

No abstract available.

AD-A087 973/4 PC **A02**/MF **A01**
Naval Medical Research Unit No 2 APO San Francisco 96528
Heat-Labile Enterotoxigenic Escherichia coli Infections in New Arrivals at Subic Naval Base, the Philippines.
Technical rept.,
Peter Echeverria, Perry V. Childers, Gary L. Anderson, and John H. Cross. 1978, 6p Rept no. NAMRU-2-TR-841
Pub. in Military Medicine, v144 n3 p173-174 Mar 79.

No abstract available.

AD-A087 974/2 PC **A02**/MF **A01**
Naval Medical Research Unit No 2 APO San Francisco 96528
Failure of Colistin in the Treatment of Undifferentiated Diarrhea in the Philippines.
Technical rept.,
Peter Echeverria, Alberto K. Alcantara, Cesar V. Uylangco, and Lourdes Santiago. 1979, 7p Rept no. NAMRU-2-TR-842
Pub. in the Jnl. of the Manila Medical Society, v17 n2 p31-35 Apr-Jun 79.

No abstract available.

AD-A087 995/7 PC **A03**/MF **A01**
ENSCO Inc Springfield VA Signal Analysis Systems Div
Analog to Digital Conversion of Electroencephalographic Data.
Final rept.
31 Oct 79, 38p
Contract DAAK70-79-M-4337

No abstract available.

AD-A088 108/6 PC **A02**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Functional Difference Equations and an Epidemic Model.
Interim rept.,
Lawrence Turyn. 9 Jun 80, 13p AFOSR-TR-80-0565
Grant AFOSR-76-3092

We consider an epidemic model for the form S implies I which implies S iwth history on (-infinity, 0>. The well-known threshold phenomenon is discussed in terms of the stability of a functional difference equation, also known as the translation-invariant renewal equation. Since the difference equation has infinite delay, the work of other authors on finite-delay problems is extended. Also, epidemic models with spatial effects are discussed by extension of the results to difference equations in a Banach space. (Author)

AD-A088 136/7 PC **A02**/MF **A01**
Naval Dental Research Inst Great Lakes IL
Biologic Preparation of Diseased Root Surfaces,
M. R. Wirthlin, and E. B. Hancock. 1980, 9p Rept no. NDRI-PR-80-09
Pub. in Jnl. of Periodontology, v51 n5 p291-297 May 80.

No abstract available.

AD-A088 190/4 PC **A17**/MF **A01**
Army Inst of Surgical Research Fort Sam Houston TX
Annual Research Progress Report, 1 October 1978 - 30 September 1979.
30 Sep 79, 376p

This report documents the clinical and laboratory activities of the US Army Institute of Surgical Research during the fiscal year 1979. These activities include patient care, clinical investigation and laboratory research in the areas of (1) burn injury, (2) acute renal failure, and (3) general trauma. Special emphasis is placed on the clinical management of burned patients and on studies related to prevention and treatment of burned wound infection. (Author)

AD-A088 210/0 PC **A03**/MF **A01**
WESTEC Services Inc San Diego CA
Medical Treatment Facility Workload Documentation Guide.
Final rept. 1 Sep 78-1 Sep 79,
W. T. Rasmussen, H. W. Holmerud, and J. A. Kuhlman. 15 Apr 80, 48p NOSC-TD-357
Contract N00123-77-D-0458

Methodologies suitable for collection of patient, communications, and facility profile data to be used in determining the appropriate computer network and size for a given health care facility are presented. Study was directed toward capture of information for site characterization prior to implementation of computerized data handling system networks for military hospitals. (Author)

AD-A088 424/7 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Trypanosoma musculi; Absence of 51CR Binding to Bloodstream Trypomastigotes.
Final rept.,
Lorrita Powell Watson, and Clarence Matthews Lee. 26 Oct 78, 6p Rept no. NMRI-79-110
Pub. in Zeitschrift fuer Parasitenkunde, v59 p299-301 1979.

No abstract available.

AD-A088 425/4 PC **A02**/MF **A01**
Georgetown Univ Washington DC Lombardi Cancer Center
Human Antigen Specific Helper T Cell Factors in B Cell Responses.
Final rept.,
James N. Woody, Ann Rees, Nathan J. Zvaifler, Sarah Howie, and Aftab Ahmed. 1979, 18p NMRI-79-103
Contract N00014-77-C-0748
Pub. in Antibody Production in Man, p193-207 1979.

No abstract available.

AD-A088 428/8 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Lyophilized Veins as Vascular Substitutes.
Final rept.,
M. H. Goldman, D. M. Strong, D. Brickley-Parsons, D. A. Floering, and K. Gawith. 1979, 5p Rept no. NMRI-79-0113
Pub. in Transplantation Proceedings, v11 n2 p1510-1511 Jun 79.

No abstract available.

AD-A088 429/6 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Differential Effects of Interferon on the MHC Expression of Human Lymphocytes.
Final rept.,
Abdelfattah M. Attallah, and Douglas M. Strong. 22 Nov 78, 8p Rept no. NMRI-79-0114
Pub. in International Archives of Allergy and Applied Immunology, v60 p101-105 1979.

No abstract available.

AD-A088 430/4 PC **A02**/MF **A01**
Georgetown Univ Washington DC Immunologic Oncology Div
Human PL Cells Grown as Continued T-Cell Cultures.
Final rept.,
F. Pappas, G. D. Bonnard, R. J. Hartzman, and D. M. Strong. 1979, 10p NMRI-79-0115
Contract N00014-76-C-1173
Pub. in Transplantation Proceedings, v11 n4 p1986-1989 Dec 79.

No abstract available.

AD-A088 431/2 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Reduced Granulocyte-Macrophage Colony-Stimulating Activity by Mitogen-Stimulated Lymphocytes from Patients with Aplastic Anaemia.
Final rept.,
Thomas L. Weatherly, Thomas A. Fleisher, and Douglas M. Strong. 2 Oct 78, 9p Rept no. NMRI-79-0116
Pub. in British Jnl. of Haematology, v43 p335-340 1979.

No abstract available.

AD-A088 434/6 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Osteopetrosis.
Final rept.,
James F. Gaines, William R. Cotton, and Edward P. Leonard. 1979, 4p Rept no. NMRI-80-3
Pub. in Comparative Pathology Bulletin, v12 n1 p3-4 Feb 80. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A088 435/3 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
In Vitro Stimulation of Human Peripheral Blood Lymphocytes by Soluble and Membrane Fractions of Renografin-Purified Typhus Group Rickettsiae.
Medical research progress rept.,
A. Louis Bourgeois, Gregory A. Dasch, and Douglas M. Strong. 1979, 12p Rept no. NMRI-80-4
Pub. in Infection and Immunity, v27 n2 p483-491 Feb 80.

No abstract available.

AD-A088 436/1 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Effect of Temperature on Collagen-Dissolving Ability of Sodium Hypochlorite Endodontic Irrigant.
Medical research progress rept.,
Walter T. Cunningham, and Aram Y. Balekjian. 1979, 5p Rept no. NMRI-80-5
Pub. in Oral Surgery, Oral Medicine, Oral Pathology, v49 n2 p175-177 Feb 80.

No abstract available.

AD-A088 437/9 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Specific Immunoglobulin M Response to Hepatitis A Virus Determined by Solid-Phase Radioimmunoassay,
Stanley M. Lemon, Carlton D. Brown, Dolores S. Brooks, Thomas E. Simms, and William H. Bancroft. 1980, 12p

No abstract available.

AD-A088 452/8 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Genetic and Physical Evidence for Plasmid Control of Shigella Sonnei form I Cell Surface Antigen,
Dennis Kopecko, Othello Washington, and Samuel B. Formal. 1980, 10p
Pub. in Infection and Immunity, v29 n1 p207-214 Jul 80.

No abstract available.

AD-A088 456/9 PC **A02**/MF **A01**
Institute for Medical Research Kuala Lumpur (Malaysia)

The Longevity of Antibody to Rickettsia tsutsugamushi in Patients with Confirmed Scrub Typhus,
J. P. Saunders, G. W. Brown, A. Shirai, and D. L. Huxsoll. 1 Jun 79, 7p
Grant DAMD17-78-G-9440
Pub. in Transactions of the Royal Society of Tropical Medicine and Hygiene, v74 n2 p253-257 1980.

No abstract available.

FRNC-TH-721 PC **A07**/MF **A01**
Centre Universitaire d'Angers (France).
Value and Place of Double-Labelling Liver Scintigraphy in the Diagnosis of Hepatocarcinomas. Advantages of exp 75 Se-L-Selenomethionine.
J. Aubry. 1976, 127p
In French.Thesis.
U.S. Sales Only.

Double-labelling liver scintigraphy was used to specify the nature of lacunar images visible on conventional liver scintigraphs. The method is based on the successive injection of two radio-elements of different energies: 99m technetium in colloidal sulphide form than exp 75 Se-L-selenomethionine. Each injection is followed by a scintigraphic recording with a scintillation camera and a data processing system allows the 99m technetium image to be subtracted from that obtained by exp 75 Se-L-selenomethionine. Electronic subtraction operations have the advantage that the tumour image is visible not only in cases of exp 75 Se-L-selenomethionine hyperfixation but also when an isofixation or moderate hypofixation exists in the pathological or lacunar zone. This double-labelling scintigraphic examination is extremely valuable diagnostically in distinguishing between a primary and a secondary liver cancer: 58 hepatocarcinomas and 29 liver metastases were in this way explored, in addition to 10 mixed observations of benign liver tumours and extrinsic liver compressions. Primary and secondary liver cancers may be characterised by a exp 75 Se-L-selenomethionine uptake index in the lacunar zones and can hence be distinguished more objectively. (Atomindex citation 11:513890)

FRNC-TH-784 PC **A04**/MF **A01**
Lyon-1 Univ. (France).
Dynamic Radioisotopic Study of the Salivary Glands. Quantification Test.
A. B. Estour. 1976, 74p
In French.
U.S. Sales Only.

Quantified dynamic radioisotopic exploration, a new and rational examination, should find its place in a thorough check-up of the salivary glands together with clinical, immunological, anatomopathological and sialographic investigations. The object of this work was to standardise the test procedure with a view to routine use on patients and to define certain quantified parameters representing objectively the different aspects of the salivary functions. Our procedure through needing sophisticated equipment, is simple to perform and relies on use of: radiotechnetium employed at activities which allow repetitive exlorations whereby pathological changes may be followed; the gamma camera and its data processing system which records all radioactive information obtained on the patient's head. These results will supply the data needed to judge the salivary functions as a whole. The apparatus used provides a remarkable pictorial record made up not only of morphological and functional images at each stage of the examination but also of ciphered radioactivity versus time curves for each of the main salivary glands and for any other zone of interest. From these curves it is then possible to define quantified parameters, reproducible and expressing functional activity. This procedure, safe and painless, seems to suit the patients who lie still without complaint for 60 minutes, 45 minutes for the concentration study and 15 minutes for the post-stimulus excretion study. The dynamic radioisotopic examination of the salivary glands, by the comparison of concentration and excretion images and by the study of parameters, separately and as a whole, is thus a useful complement to other paraclinical examinations and contributes essential information in most salivary diseases. (Atomindex citation 11:513906)

FRNC-TH-785 PC **A04**/MF **A01**
Lyon-1 Univ. (France).
Study of Immediate Technetium 99M Uptake by Intracranial Meningiomas and Meningoblastomas.
G. Garcin. 1976, 62p
In French.Thesis.
U.S. Sales Only.

The immediate uptake of technetium 99m in 43 meningiomas and meningoblastomas, observed with a scintillation camera, was analysed. The study concerns the first 30 seconds of the scintigraphic examination, a period corresponding to the arrival of the tracer in the carotids and its progress in the brain circulation (arterial time, capillary time and venous time). The principle of the examination and the facilities of use of the tracer employed are described, after which the examination procedure and the normal images obtained are reported. The technique applied to these 43 patients revealed an instant uptake site in 37 cases, i.e. about 65%. Of the 6 remaining cases 2 were meningiomas of the posterior cranial fossa, 1 was due to technical mistakes, another corresponded to a cystic meningioma of the convexity and the last two to meningiomas of the small splenoid wing. These results confirm those of other authors. Other immediate uptake centres are provided by angiomas, arteriovenous aneurisms and certain glioblastomas. This sign although very important for the meningioma diagnosis, must be corroborated by results of other examinations. It would be useful to make a kinematic study of instant uptake in order to establish, if possible, the exact time of appearance (arterial, capillary or veinous) of this site in meningiomas and in other tumours where the some clinical sign is observed. (Atomindex citation 11:513912)

FRNC-TH-786 PC **A05**/MF **A01**
Lyon-1 Univ. (France).
Value of Bone Scintigraphy in the Search for Metastases of Primary Bronchial Carcinomas (Relative to 8 Observation).
R. Lanuit. 1976, 83p
In French.Thesis.
U.S. Sales Only.

99m-technetium-labelled pyrophosphates are used at present. This technique combines the tropism of inorganic phosphates for the skeleton with the particularly suitable physical characteristics of technetium. The bone receives on irradiation of 0.5 rads for 10 millicuries of technetium, i.e. the equivalent of three lung X-rays, which means that the examination can safety be carried out on children. The scintigraph is performed with a two-head scanner giving a frontal image, showing in particular the shoulders, sternum, ribs and pelvic belt, and a dorsal image giving a better view of the spine and especially the sacro-iliac joints. When bone metastases are investigated by scintigraphic as compared to radiographic examination it should be remembered that 99mTc-labelled pyrophosphate scintigraphy, while revealing bone metastases at a pre-radiological stage in some cases, cannot distinguish between a benign and a malignant hyperfixing lesion nor show whether or not several lesions on the same scintigram are similar in origin. In this respect these two paraclinical examinations are complementary and give excellent results when used together. (Atomindex citation 11:513931)

FRNC-TH-787 PC **A05**/MF **A01**
Lyon-1 Univ. (France).
Contribution of Sup(99M)Tc Pertechnetate Brain Scintigraphy in the Diagnosis of Tumours of Posterior Fossa.
A. Sergent. 1976, 91p
In French.Thesis.
U.S. Sales Only.

The present work concerns 38 posterior cranial fossa tumour cases subjected to sup(99m)Tc pertechnetate brain scintigraphy between May 1974 and June 1976. 33 of these patients have undergone an anatomical check while for the remaining 5, the existence of a posterior fossa tumour is established from the conjunction of clinical signs and other paraclinical examinations. The procedure was the same for all these 38 patients: after a 300 mu C/kg injection of tracer, an immediate angioscintigraphic period, an early set of pictures (half an hour after the tracer injection) then delayed set (4 to 5 hours later) taken from 4 angles: front, back and two profiles. The examination was performed with an OHIO NUCLEAR SIEMENS gamma camera and sometimes a conventional scanner as well (the latter giving no better a diagnosis than the former). In 75% of the cases a hyperfixation of the injected tracer was observed and its site located quite accurately in the posterior fossa tumour. The etiology of the lesion could be diagnosed in 'most probable' or 'least probable' terms. Examination of work by other authors, who obtained similar results, leads to the conclusion that this method is very helpful in the diagnosis of posterior fossa tumours when used as a means of early detection, before the undertaking of more complex neuroradiological explorations. (Atomindex citation 11:513966)

FRNC-TH-788 PC **A06**/MF **A01**
Montpellier-1 Univ. (France).
Value of Sialography and Salivary Gland Scintigraphy in the Evaluation of Rheumatoid Polyarthritis.
M. M. Rousse. 1976, 113p
In French.Thesis.
U.S. Sales Only.

This work aims to establish the frequency and severity of salivary gland disease. Very many techniques are available for the exploration of these glands. Each patient was subjected to: a parotid sialograph, a technetium 99m exploration of the salivary glands and mouth cavity. These two methods of salivary gland exploration should be carried out together, since sialographic data are largely static and anatomical while scintigraphy mainly supplies dynamic, functional data. The scintigraphic examinations were carried out with a Picker Dyna Camera II coupled to data processing units (NUKAB system with recorded programmes). The radiotracer used is technetium 99m. 2 millicuries of technetium as pertechnetate are injected intraveinously and reach the salivary glands through their vascular networks, thus being available to the different tissues of each gland: interstitial tissue, acini, intralobular ducts, efferent ducts. (Atomindex citation 11:513962)

FRNC-TH-789 PC **A07**/MF **A01**
Montpellier-1 Univ. (France).
Comparison of Scanning Scintigraphy and Laparoscopy-Biopsy Data in the Diagnosis of Liver Diseases. First Results Based on 35 Cases.
R. Guillet. 1976, 143p
In French.Thesis.
U.S. Sales Only.

The liver is implicated in many functions, particularly the bile function, metabolic phenomena concerning glucids, lipids, proteids and coagulation, certain enzyme functions and cleansing processes involving a liver uptake stage followed by a biliary or urinary excretion stage. In view of the complexity of this metabolism it is obviously difficult to investigate the liver functions as a whole by a single set test. Furthermore the analysis of information supplied by scintigraphy implies rather complex technology, especially as these data are not always expressed in a universal form which clinicians can interpret directly. This can raise a barrier between the records and the doctor causing errors to appear not only in the interpratation but also in the indication of what method and products should be used. One of the aims of our future research is to demonstrate the inadequacy of a standard method using a single procedure and only one radioactive substance in hepatobiliary diseases of different mechanisms. To begin with therefore we should like to establish the advantages and limits of 99m technetium in the scanning scintigraphy morphological exploration of the liver, taking laparoscopy as a basis by comparison. We shall then attempt to define the criteria which in our opinion would allow a more rational use of liver scintigraphy in our medical care unit. (Atomindex citation 11:513917)

FRNC-TH-790 PC **A04**/MF **A01**
Montpellier-1 Univ. (France).
Contribution of Scintigraphy in the Search of Liver Metastases.
G. Maune. 1976, 69p
In French.Thesis.

U.S. Sales Only.

An outline of some general scintigraphic principles is followed by a non-isotopic study of liver metastases in order to compare the different methods. Liver scintigraphy is then examined from the viewpoint of both the method itself and the results to be expected. This study covered 62 observations of confirmed metastases and 36 for which a metastase was eliminated, i.e. 98 records altogether. The technique involved the use of technetium with a large (5-inch) scintillating crystal and a beehive collimator. No mishap occurred as a result of this examination. Scintigraphy offers a very useful means of exploration because false negatives are rare (4 doubtful cases for 58 positives in our series), but false positives are much more troublesome: 5 are noted in 36 cases and it seems that the real problem is confusion with cirrhosis. It is therefore necessary to follows up with arteriography, which seems to be a reliable examination in spite of the limited number of cases investigated. (Atomindex citation 11:513941)

FRNC-TH-791 PC **A06**/MF **A01**
Nancy-1 Univ. (France).
Study of Regional Lung Ventilation and Perfusion by Xenon 133.
Y. Lombard. 1976, 108p
In French.Thesis.
U.S. Sales Only.

The present work consists of a regional lung exploration after injection of xenon 133, dissolved in physiological serum, followed a few minutes later by that of 99m Tc-labelled serumalbumin microspheres. The aim is three fold: first of all to study perfusion and ventilation by xenon 133, next to compare the results obtained after xenon 133 and 99 m Tc-labelled microsphere injection, lastly to establish the value of the technique and its routine application. This examination has not solved all problems of lung exploration by xenon 133. For example we deliberately kept to intraveinous injection of the gas dissolved in physiological serum, leaving aside the breathing test. Xenon 133 scintigraphy in our opinion will not tend to replace 99m Tc-labelled microsphere scintigraphy, which has irreplaceable morphological qualities, but will serve as an excellent complement. The basic advantage of xenon 133 is the regional ventilation estimate it provides allowing any anomaly of the lung parenchyma to be located immediately or conversely the functional value of the healthy lung to be established with a view to a surgical removal of a diseased zone. (Atomindex citation 11:513933)

FRNC-TH-792 PC **A06**/MF **A01**
Aix-Marseille-2 Univ. (France).
Selenomethionine Scintigraphy in the Diagnosis of Cold Thyroid Nodules.
C. Rinaldi. 1976, 108p
In French.Thesis.
U.S. Sales Only.

This work attempts to establish the value of a tumoral radiotracer for thyroid exploration: exp 75 Se-labelled methionine. The purpose of such a radioelement for US in scintigraphy is to allow the cold thyroid nodule diagnosis to be established before surgery, the extent of which depends on whether the nodule is benign or malignant. After a survey of present thyroid cancer diagnosis methods the different tumoral radiotracers are reviewed especially those used to diagnose thyroid neoformations. Selenomethionine appears as one of the most universal of these radiotracers since methionine is an essential amino acid involved in protein synthesis, which is accelerated inside tumour cells, while selenium itself in the form of certain salts possesses a known tropism for neoplastic tissues. The original feature of our study is the use of a method attempting to optimise the results by a more objective reading of the images. To this end we employed a scintillation camera for image acquisition and a data processing system to perform an electronic subtraction, on the thyroid image obtained with selenomethionine, of the thyroid image supplied by radioiodine. The method is nevertheless limited by the properties of the radiotracer used: its long physical and biological half-life is a contra-indication in patients under forty, the dose received by the gonads being relatively large. (Atomindex citation 11:513961)

FRNC-TH-793 PC **A08**/MF **A01**
Rennes-1 Univ. (France).
Isotopic Scintigraphy in Kidney Grafting.
R. Renfro. 1976, 157p
In French.Thesis.
U.S. Sales Only.

Isotopic explorations of kidney transplants were performed on sixty-six patients. Three scintigraphic techniques were used: labelled ferrous ascorbate scintigraphy, sequential 99m technetium DTPA scintigraphy and the exp 131 I hippuran nephrogram. The aim of this study is to analyse the results obtained under different pathological circumstances affecting the transplant, to discuss the advantages of the techniques and to propose a working procedure. The most reliable and accurate technique is the exp 131 I hippuran nephrogram combined with sequential 99mTc DTPA, by which renal vascularisation may be judged labelled ferrous ascorbate on the other hand is too insensitive. Although the information supplied is mostly contained in the scintigraphic images, the nephrographic curves and the blood radioactivity decay time and rad V/rad R ratio measurements are very helpful in the early diagnosis and differential diagnosis of complications affecting the transplant. The proper use of isotopic scintigraphy in kidney grafting should provide optimum conditions for better survival of the transplant at minimum risk to the patient. (Atomindex citation 11:513959)

FRNC-TH-794 PC **A04**/MF **A01**
Nantes Univ. (France).
Ytterbium 169 Citrate in the Diagnosis of Lung Opacities of Cancerous Origin.
P. Peltier. 1976, 74p
In French.Thesis.
U.S. Sales Only.

Lung scintigraphy for tumour exploration has been widely studied for some years, but unfortunately with the many radioisotopes used at present this examination is not entirely reliable. It seemed interesting therefore to investigate a new tracer, exp 169 Yb citrate, the properties of which were demonstrated recently by HISADA. To estimate the specificity of this tracer we chose 62 records of different bronchopulmonary diseases. After an introductory review of various diagnostic methods the physical and physiological characteristics of ytterbium citrate and its method of use are described, then the records examined are presented and our thoughts and conclusions discussed. exp 169 Yb citrate possesses excellent biophysical properties for tumour scintigraphy but this isotope, though causing no radioactive pollution, delivers an appreciable irradiation dose to the patient examined. It has a positive tropism for pathological lung images. The fixation index of the documents taken separately, apart from that of the 14th day, cannot distinguish between benign and malignant diseases. This is possible with the kinetic uptake curve and the index ratios for the 2nd and 14th days. With these diagnostic criteria the overall results are better than those obtained with other commonly used radioisotopes: true positives 70%, false negatives 11%, false positives 4.5%. (Atomindex citation 11:513953)

FRNC-TH-800 PC **A06**/MF **A01**
Amiens Univ. (France). Lab. de Physique Theorique des Particules.
Contribution of Double-Labelling Scintigraphy to the Diagnosis of Chronic Pancreatitis (Relative to 50 Observations).
J. Palmas. 1975, 113p
In French.Thesis.
U.S. Sales Only.

This study, after a short anatomical and anatomopathological survey, outlines the main stages in the discovery of the pancreatic label and attempts to define the practical problems encountered in the application of scintigraphic methods. The choice of pancreatic indicator is shown to have been very difficult and the substance used, after much research, is still imperfect: Se75-labelled methionine. To offset the defects of this tracer some remarkable techniques have been developed, for example electronic subtraction to cut out the liver image. The equipment used is then described, together with the working procedure adopted at the Angers U.H.C. The results obtained on 50 observations are given in table form. In the discussion the following points are dealt with in turn: scintigraph interpretation criteria, the diagnostic contribution of scintigraphy, the place of this examination in the positive diagnosis of chronic pancreatitis. Examination of a limited number of observations leads to certain conclusions in agreement with those formulated by many authors. The scintigram is first and foremost a 'function of the active parenchyma mass'. According to LEGER it is limited by the fact that the scintigraph cannot distinguish between different pathological processes. Nevertheless this examination is considered to have real diagnostic value in pancreatic diseases, especially when all abnormal images exist. (Atomindex citation 11:513951)

FRNC-TH-806 PC **A06**/MF **A01**
Limoges Univ. (France).
Information for the Diagnosis of Broncho-Pulmonary Diseases Obtained by the Combined Use of Perfusion Lung Scintigraphy and Selective Bronchial Arteriography.
M. Wouamba Foning. 1976, 103p
In French.Thesis.
U.S. Sales Only.

The study is limited to perfusion lung scintigraphy and deals with the following in turn: - radioisotopes and their conditioning, - detection and recording equipment, - results and limits of the method. The tracers used here were radioiodine-labelled human albumin macro-aggregates and more especially technetium-labelled microspheres. Scintigraphy, which visualizes or charts the local distribution of radioactive indicators, is carried out with two kinds of apparatus, scanners and scintillation cameras. The information acquired may be accurately analysed at the same time owing to modern data processing systems. The interpretation of radiotracer lung transit curves made by several authors is not very useful for our work, consequently we have kept to the analysis of images obtained by the Anger camera or similar instruments. The Anger scintillation camera seems to be well suited to isotopic lung exploration providing morphological and functional data simultaneously. Perfusion lung scintigraphy, which reflects the quality of lung circulation at the capillary level, appears to be a valuable asset in the diagnostic approach to certain chest X-ray images. The technique is fast, painless, neat, harmless and almost never contra-indicated. However like other techniques it cannot solve every problem on its own. Under these conditions, we must admit, on weighing up the results of this study, that perfusion lung scintigraphy had to be followed in most cases by selective bronchial arteriography. (Atomindex citation 11:513983)

FRNC-TH-807 PC **A05**/MF **A01**
Strasbourg-1 Univ. (France).
Doubling Time of Liver Metastase Images.
B. Bittighoffer. 1975, 76p
In French.Thesis.
U.S. Sales Only.

For our study, where clinical and scintigraphic observation seldom lasts more than two years and where measurable metastases always exceed 1 cm exp 3 , the exponential model was adopted and our results were all calculated with GERSTENBERG's formula which gives an apparent doubling time. The liver metastases were measured on the scintigraphic image obtained, a more or less sharply limited blank which makes for a first difficulty of judgement. Two magnascanner V type PICKER 5-inch crystal scintigraphs were used, giving three images simultaneously by a transcriber made up of a stylus and a light spot built into the detection system. The isotope used is colloidal gold (exp 198 Au) phagocytized by the Kuepfferian reticulo-endothelial system. The doubling time for liver metastase scintigraphic images calculated for fifteen patients having undergone one or more isotopic checks after a first metastase image was discovered range from 10 to 103 days. (Atomindex citation 11:513893)

FRNC-TH-808 PC **A04**/MF **A01**
Strasbourg-1 Univ. (France).
Contribution to the Study of Thallium 201 Myocardium Scintigraphy.
M. Annweiler. 1976, 69p
In French.Thesis.
U.S. Sales Only.

In this work a new isotope was tested in the field of myocardium scintigraphy: thallium 201. The different radioisotopes used so far in myocardium scintigraphy are reviewed to begin with. The main biological and physical characteristics of thallium and the scintillation camera used for this work are described next. In our opinion thallium 201 owing to its biological behavior similar to that of potassium and to its physical characteristics, appears as one of the better -if not the best- known tracer suitable for use in myocardium scintigraphy. Its properties are suited to the use of a scintillation camera, which considerably shortens the examination time and thus allows an isotopic exploration of the myocardium from several incidences. The only disadvantage of this cyclotron-produced isotope seems to be its high price which will probably limit its use on a large scale. Fifty thallium 201 myocardium scintigraphs were practised on forty-eight coronary thrombosis patients. From this was established a precise topographic correlation between the electrocardiographic diagnosis and the scintigraph. The two corresponded in 47 cases out of 50. The few disagreements between ECG and scintigraphic results seem to be due either to poor-quality images or to an overall myocardium hypofixation connected with a very extensive necrosis. This means that thallium 201 myocardium scintigraphy is a reliable method of examination in the great majority of cases, giving a direct picture of the heart muscle and its necrotic lesions. (Atomindex citation 11:513889)

FRNC-TH-809 PC **A06/MF A01**
Strasbourg-1 Univ. (France).
Contribution of Technetium Pyrophosphate Bone Scintigraphy in the Evaluation of Prostate Cancer Extension Based on 100 Cases.
A. Oliveux. 1976, 109p
In French.Thesis.
U.S. Sales Only.

The aim of this work was to compare the results of technetium 99m pyrophosphate bone scintigraphy with those of the standard radiographic exploration of the skeleton in order to find out whether scintigraphic data allow an earlier and more accurate diagnosis of the presence of bone metastases. The dose administered is about 10MCi per patient; the recording is made 4 hours after intravenous injection of the tracer. The documents are obtained in two stages: - first of all a whole-body scintigraph is carried out by means of an 'omniview' system adapted to the Picker dynacamera. This instrument gives an image of the entire body by translation of the patient's bed before the detection head of the camera; - immediately after the whole-body scan a series of static views is taken, especially on abnormal or doubtful areas. These documents have a better resolution than the reduced whole-body image and supply complementary data all the more valuable as they are directed towards the zones of interest. Analysis of our observations underlines the advantages of technetium 99m pyrophosphate bone scintigraphy in the evaluation of prostate neoplasm extension. This particularly sensitive method of investigation enables bone metastases to be detected earlier and more precisely in a patient presenting a neoplasm. (Atomindex citation 11:513949)

FRNC-TH-810 PC **A06/MF A01**
Toulouse-3 Univ. (France).
Contribution of Technetium 99M-Labelled Pyrophosphate Bone Scintigraphy in Infectious Spondylodiscitis.
M. T. Capdepont. 1976, 101p
In French.Thesis.
U.S. Sales Only.

This work examines the contribution of technetium 99m(sup(99m)Tc)-labelled pyrophosphate bone scintigraphy in infectious spondylodiscitis and attempts to define its importance in the diagnosis of lesions and their subsequent supervision in patients under treatment. 5 to 15 millicuries of sup(99m)Tc-labelled pyrophosphates are injected intravenously. Bone uptake is strong and durable; 1.3% of the injected activity is found in the blood by the fifth hour. The skeleton may be explored: - either one segment at a time with a scintillation camera, - or all at once and more quickly with a whole-body device taking front and black exposures. Bone scintigraphy appears as a basic technique in the study of infectious spondylodiscitis. Moreover the use of increasingly efficient equipment, the quantification of results and perhaps the development of new tracers augur well for a technique which is already acknowledged to be of fundamental interest. (Atomindex citation 11:513896)

FRNC-TH-811 PC **A05/MF A01**
Toulouse-3 Univ. (France).
Perfusion Lung Scintigraphy in Primary Broncho-Pulmonary Cancer.
P. Lapergue. 1976, 91p
In French.Thesis.
U.S. Sales Only.

Research on primary broncho-pulmonary cancer has called extensively on scintigraphy and it seemed interesting to weigh up the pros and cons of the technique in this particular case. Our intention is to sum up objectively from recent documents the applications of scintigraphy in the study of primary broncho-pulmonary cancers and to attempt, on the basis of the results compiled, to show what benefits have been gained from this technique and to find out whether it has any presurgical value and of what kind. The technique was invariable; the tracer consists of human albumin macro-aggregates labelled with technetium 99m which by its short half-life and slight penetration enables four exposures to be taken during the same examination (front, back, right and left profiles), thus reducing the risks of mistaken diagnoses due to the use of a single incidence. Similarly the detection method was always the scintillation camera which explores the whole organ at once, considerably shortening the examination time. Lung scintigraphy by perfusion of labelled human albumin macro-aggregates offers the great advantage of being simple to use and harmless. It is easy to understand the important place it has taken in the range of methods available for lung circulation exploration. (Atomindex citation 11:513932)

FRNC-TH-831 PC **A06/MF A01**
Paris-5 Univ. (France).
Scintigraphy in the Diagnosis of Liver Cancers. Study of 54 Observations with Anatomical Confrontation.
R. D. A. Labro. 1976, 101p
In French.Thesis.
U.S. Sales Only.

This study attempts to judge the reliability of scintigraphy in the diagnosis of liver cancers. It concerns 54 observations with anatomical confrontation (laparoscopy, biopsy, laparotomy and/or autopsy). Technetium 99m scintigraphy gives a correct diagnosis in 81.5% of the cases, whether cirrhosis is present or not. Scintigraphy is only one stage in the investigation of neoplasic liver disease. This study shows that all too often it is practised alone since of 201 observations only 54 include another examination. and of these only 21 a laparoscopy. The simultaneous use of scintigraphy and laparoscopy eliminates false positives and reduces the percentage of false negatives from 7.5% to 4%. The two methods combined are therefore reliable to 96% (i.e. 96% of successful diagnosis in liver cancer tests. This work was performed with the techniques available in 1973. The quality of the scintigraphic image should be improved by technical progress in the form of new isotopic products, cameras with better definition and computerized data processing. With these new techniques it will certainly be possible to detect very small lacunae and to observe in more detail their diffusion in the liver parenchyma. (Atomindex citation 11:513930)

FRNC-TH-832 PC **A05/MF A01**
Paris-7 Univ. (France).
Value and Indications of Liver Scintigraphy in the Initial Assessment of Bronchopulmonary Cancers.
S. Heinrich. 1976, 76p
In French.Thesis.
U.S. Sales Only.

This retrospective study of 117 liver scintigraphs, carried out systematically in the initial examination of bronchopulmonary cancer patients, attempts to define the value and indications of the method in the diagnosis of liver metastases at the stage when the primary cancer is discovered. Its sensitivity and reliability were estimated by comparing the interpretation of the scan with the actual situation. Scintigraphic diagnosis meets with several difficulties. It is ruled by technology: in spite of many improvements it seems that the quality of conventional scintigraphy has reached its limits, through transverse axial tomodensitometry may be a future solution. Morever its interpretation depends on the experience and temperment of the observer, as shown by the results of double-blind readings. Finally the examination is not specific to the nature of the liver disease. It seems that without prejudice to the patient the indications of liver scintigraphy in the initial assessment of bronchopulmonary cancer may be limited to cases where some clinical or biological doubt on the integrity of the liver is present. (Atomindex citation 11:513921)

FRNC-TH-833 PC **A05/MF A01**
Paris-5 Univ. (France).
Quantitative Renal Scintigraphy: Anatomo-Clinical and Biological Correlation (Concerning 51 Mercury 197 Renal Scintigraphs).
J. M. Pinganaud. 1976, 99p
In French.Thesis.
U.S. Sales Only.

To find out whether the renal mercury uptake measurement in urology is a satisfactory way to judge the separate functional value of the kidneys the records of 51 patients were examined. The exploration took place as follows: - injection of 300 mu Ci exp 197 HgCl sub 2 , - measurement of the radioactivity fixed on each kidney, three days later, by means of a gamma camera. Of these 51 uptake measurements only one result appears inconsistent by excess. All the others agree perfectly with comparative observations. On the whole a close correlation is found between the renal mercury uptake measurement and the various clinical, urographic and anatomical data obtained on this group of patients. The method seems to be ideal because it is reliable, harmless and repeatable. Where dosimetry is concerned an injected dose of 300 mu Ci delivers 9mrad to each kidney, 6mrad to the ovaries. By way of comparison it is interesting to note that an intraveinous urograph with 5 exposures delivers 500mrad to the ovaries. It is considered safe to repeat the examination 3 to 4 times on one patient. (Atomindex citation 11:513965)

FRNC-TH-835 PC **A04/MF A01**
Paris-6 Univ. (France).
Indium 111 Scintigraphy in the Exploration of the Erythropoietic Marrow (Relative to 42 Observations).
G. C. R. Guerin. 1976, 58p
In French.Thesis.
U.S. Sales Only.

The bone marrow is difficult to explore as a whole because of its wide non-uniform distribution, variable with the hematopoietic and supporting tissue sites. exp 111 indium-transferrine bone marrow scintigraphy is a new technique which partly overcomes these difficulties and gives an idea of the overall distribution and richness of the erythropoietic marrow, thus showing up the erythropoiesis sites at a given moment. The properties of indium as medullary tracer are bound up with the characteristics of its metabolism which, to some extent at least resembles that of iron. The two main features are: - its fixation on transferrine (or siderophiline); - its binding to reticulocytes. Moreover indium 111 fulfils the physico-chemical criteria necessary for scintigraphic practice (long half-life, emission detectable by conventional scintigraphs, moderate irradiation of the patient). The properties of this radioelement and the technical conditions of use are examined in turn, then scintigraphic data are compared with the results of traditional bone marrow investigations: medullary biopsy and blood cell counts with reticulocyte fraction. This comparison concerns 42 scintigraphs carried out on patients suffering from various hematological diseases, with prospects of serious development in common. (Atomindex citation 11:513916)

FRNC-TH-837 PC **A06/MF A01**
Paris-5 Univ. (France).
Comparison of Angiographic, Gammagraphic, and Histological Data in Orbital Tumours: Concerning 13 Observations.
M. T. Emery. 1976, 108p
In French.

U.S. Sales Only.

The aim of this work is to compare the value of gammagraphic and angiographic examinations in intra-orbital expansive processes and to hole for a histological explanation when the two examinations disagree. All the gammagraphs used were obtained with technetium 99m-labelled ferrous ascorbate. Orbital gammagraphy requires a radioelement combining the advantages of easily detectable radioactivity and fast elimination from healthy tissues while keeping a strong tumoral uptake. Sup(99m)Tc-labelled ferrous ascorbate fulfils these conditions. Technetium 99m, perfectly safe because of its short half-life and low radiation energy, allows the scintigraphic detection of expansive processes. By its association with ferrous ascorbate, which has a very high kidney and plasma clearance rate, the vascular background is reduced considerably and the relative radiotracer concentration in the diseased area increased (the background is due to fixation of the radioelement in the facial and orbital muscles, the mucous membranes of the nose and sinus and the vein sinuses at the base of the skull). The complex used in this study is obtained from 40mg ferrous ascorbate to which are added 1ml Thris buffer at pH 7.85 and 5ml 99mTc pertechnetate solution. 10 to 15 microcuries are injected intraveinously or absorbed parenterally. (Atomindex citation 11:513904)

FRNC-TH-838 PC **A04**/MF **A01**
Paris-6 Univ. (France).
Selective Intracoronary Injection of Technetium 99M-Labelled Microspheres (Outcome of 83 Examinations).
P. Delebarre. 1976, 70p
In French.Thesis.
U.S. Sales Only.

Coronarography supplies little information on the functional repercussions of a coronary stenosis and the state of the downstream arteriole bed. To overcome these inadequacies and to clarify the indications of aorta-coronary bridging, human albumin particles (microspheres or macro-aggregates) are injected into the coronary trunks during coronarography. The advantage of microspheres over macro-aggregates is their perfectly calibrated diameter (15+-5 microns). In the authors experience, and ours based on 83 examinations, the method presents no particular danger and adds very little to the time taken by conventional coronarography. For the method to be considered reliable it must be proved that the heterogeneities of distribution always correspond to anomalies of the coronary circulation, which seems not always to be the case. Our experience tends to show that as long as a hypoactivity zone or a scintigraphic blank cannot be referred with certainty to an actual functional or anatomical anomaly of the myocardium circulation this examination cannot be used as an argument for or against aorta-coronary bridging nor to predict its development. Where the study of angina pectoris with healthy coronaries is concerned a greater number of observations would be necessary in order to estimate, in cases of normal coronarography, to what extent anomalies of the coronary micro-circulation are responsible. In any case the difficulty of eliminating artefacts is a major obstacle to the reliability of the method. Radioelements such as exp 43 K or exp 201 Tl injected intraveinously seem to offer, more simply and without the risk of artefacts, the information looked for on labelled microsphere scintigraphs. (Atomindex citation 11:513898)

FRNC-TH-839 PC **A03**/MF **A01**
Paris-5 Univ. (France).
99M Technetium Pyrophosphate Myocardium Scintigraphy. First Results.
P. Toussaint. 1976, 40p
In French.Thesis.
U.S. Sales Only.

99m technetium pyrophosphate myocardium scintigraphy is a very recent examination technique. This work gives the results obtained on 61 patients. As a vector of the isotope, pyrophosphate has the advantage over polyphosphate of a fast bone uptake there it should be stressed that a 90 minute pause is necessary between the intraveinous injection of the isotope and the photographic recording so that the reading is not troubled by the labelled intracardiac blood pool image, an image quality criterion being the estimation of a good costal fixation which in fact appears sooner or later according to the subject. The role of pyrophosphate, chelator of calcium in fixation of the isotope on the myocardium, could be explained by the fast appearance of 'dense bodies', made up of calcium hydroxyapathice crystals, in the mitochondria of myocardium cells having undergone an irreversible necrotic process. The choice of 99 m technetium is based on its ease of use: 6 hour half-life, high-energy pure gamma emission at 140 keV. The fixed image studied under two incidences, front and left anterior oblique, is obtained from mobile images given by the scintillation camera used in connection with a data processing system. Several facts are underlined, explaining the disadvantages, advantages and indications of the method. (Atomindex citation 11:513976)

FRNC-TH-871 PC **A08**/MF **A01**
Toulouse-3 Univ. (France).
Study of Effects of Scattered Reaction on Physical Parameters of a New gamma Camera Used in Nuclear Medicine.
These (3e Cycle),
M. Maury. 1979, 162p
In French.
U.S. Sales Only.

This work is devoted to the analysis of the performance of a new gamma camera. This camera is characterized by the introduction of an image amplifier between the crystal detector and the localization system which compound four photomultipliers. The appreciation of performances of this new instrument is based on the measure of the physical parameters usually studied in this purpose: energy resolution, spatial resolution, modulation transfert fonction and contrast, sensitivity and deadtime. Furthermore, we have studied the influence of scattered radiation on the value of these parameters. Two studies complete this work: the artificial deterioration of the energy resolution of the camera inserting a noise, to estimate the importance of the energy resolution on the image contrast; the scanning of pulse amplitude spectra obtained from brain of patients in order to evaluate the participation of scattered radiation in the peak's constitution. We present, at last, a quality control programm for scintillation camera. (Atomindex citation 11:509219)

HRP-0028166/7 PC **A03**/MF **A01**
Health Planning and Resource Development Association of the Central Ohio River Valley, Inc., Cincinnati.
The Concept of a Regional Ceiling on Hospital Costs: A Discussion Paper. Monograph II of the CORVA Series on Regional Cost Containment Policy and Implementation Strategies.
9 Mar 78, 48p

A discussion of rising health care costs is presented and measures taken to contain those costs are outlined. It is pointed out that some health care costs have risen more rapidly than others. The single most significant element in gaining control over rapidly rising health care costs is said to be hospital expenditures. It is pointed out that nine cents out of the twelve cents of each Federal dollar spent on health care goes for hospital care. Total hospital expenditures are said to have increased at a rate twice to triple the rate of general economic inflation. A discussion of the Regional Hospital Cost Ceiling System Concept, an innovative effort aimed at lightening the impact of escalating health costs, is provided. This concept is said to be characterized by its local orientation, voluntary approach, and emphasis on prospectively defined levels of hospital cost containment. The Regional Hospital Cost Ceiling System, utilized in southwestern Ohio, tries to prospectively determine the amount of resources a community desires to allocate to the hospital sector and then utilizes a ceiling as a basis for making cost, access, and intensity tradeoffs according to the planning priorities within a particular region.

HRP-0028675/7 PC **A03**/MF **A01**
Health Planning and Resource Development Association of the Central Ohio River Valley, Inc., Cincinnati.
Containing Health Care Costs: New Perspectives on Short Term and Long Range Strategies. A Report to the CORVA Board of Trustees from the Cost Containment Task Force.
25 Oct 78, 29p

A short- and long-term health care cost containment strategy is recommended by a special task force to the Central Ohio River Valley, Inc., Board of Trustees. The principles of the strategy reject hospital cost ceilings for the time being and support austerity measures by providers, phasing out unnecessary hospital facilities and services, and incentives rather than regulations to control hospitals. Short-term measures (about five years) involve reducing the annual rate of hospital expenditures by two percent per year for 1978 and 1979, limiting addition of hospital beds, and reducing new hospital capital investment approved under certificate of need and 1122 review programs to 80 percent of the average for the preceding three years; specific activities and an implementation schedule are listed for each measure. The long-range strategy (10 to 20 years) requires reduction of need for services by altering individual life-style elements, e.g., excessive smoking, drinking, or eating, and by preventing disease through development of demonstration programs, for example, for the workplace, through a regional center for health promotion, and through a health promotion institute, as well as through provision of funds for health promotion in new legislation. An appendix containing a sample health hazard appraisal and a summary chart of specific short-term cost containment activities are provided.

HRP-0028701/1 PC **A02**/MF **A01**
Midwest Center for Health Planning, Madison, WI.
Maintaining Contact with Legislators: HSA Roles.
1979, 12p

Lobbying activities of health systems agencies (HSA's) are discussed. Lobbying, as a necessary part of the legislative process, encompasses a variety of activities on the part of individuals or groups to influence governmental action. It is permissible for tax-exempt organizations to lobby on legislative matters, although their activities are somewhat limited. A small HSA can spend up to $8,750 on lobbying, a medium-sized HSA up to $19,000, and a large HSA up to $34,750. Certain activities are excluded in determining the amount expended by an HSA for lobbying: making available the results of nonpartisan analysis, study, or research; providing advice or assistance to a government agency when requested; communicating in a directly related manner to the existence, powers, and duties or tax stutus of an organization; communicating to members of an organization about legislation of direct interest to members; and communicating with government officials or employees execpt where such communication is intended to influence legislation. Avenues available to HSA's in maintaining contact with legislators include newsletters, personal contacts, and special communications. Types of information to be incorporated in lobbying activities involve health status, agency review activities, health systems plan implementation, coordination and relationships, and emerging problems. Reference materials are cited.

HRP-0029192/2 PC **A21**/MF **A01**
Texas Bureau of State Health Planning and Resource Development, Austin.
Texas Medical Facilities Inventory and Utilization, Calendar Year 1977.
1977, 496p
Color illustrations reproduced in black and white.

Data presented in this publication covers an annual reporting period ending December 31, 1977, and reflects responses to an annual distribution of questionnaires to health facilities in Texas. Included in this annual data collection cycle are acute care facilities, those providing long-term care, mental facilities, chest hospitals, rehabilitation facilities, and out-patient facilities.

HRP-0029311/8 PC **A02**/MF **A01**
National Institutes of Health, Bethesda, MD.
HEW Health Research Principles.
Jul 79, 20p

In developing health research principles for the DHEW, it is important to recognize the following:

initially, the objective is to develop DHEW health research principles. These principles must be sufficiently specific to provide a context and framework for the subsequent development of a multi-year health research strategy. The principles must encompass the full spectrum of health research conducted and supported by the DHEW (including biomedical and behavioral research, research on disease control technologies, research in statistical and survey methodology, and health research communications), and must relate health research to the other health missions of the Department.

HRP-0029324/1 PC A03/MF A01
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Federal Health Expenditures in Massachusetts. A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Ghanotakis. 9 Jan 79, 27p
See also HRP-0029325 to HRP-0029340. Revision of report dated 7 Jun 77.

Data on Federal health expenditures in Massachusetts from 1973 to 1976 are presented in a Massachusetts Funds Flow Project report. Statistics show that the annual growth rate of expenditures has been 11.2 percent, amounting to $1.31 billion in 1976; that the largest share is for health services and supplies and the balance for research, construction, and medical education and training; that decreased expenditures for medical education have been more than offset by increases in other categories; that 86 percent of Federal expenditures come from HEW; and that 50.3 percent of Federal expenditures go for Medicare, 31.6 percent for Medicaid, and 11.6 percent for veterans' care. Other findings reveal: that hospital care has been the largest expenditure category, followed by nursing home care and physicians' services; that per capita Federal outlays for health services and supplies have remained higher in Massachusetts than the country as a whole because of hospital and nursing home care, although the gap has been closing; and that Federal expenditures for Medicare, Medicaid, and veterans' hospital and medical care are above the national average. A list of Funds Flow reports and eight data tables showing expenditures are provided.

HRP-0029325/8 PC A02/MF A01
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Issues Raised by the Analysis of Federal Health Expenditures. A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Ghanotakis. 20 Jul 77, 13p
See also HRP-0029324; HRP-0029326 to HRP-0029340.

Issues raised by comparing Massachusetts health expenditures with those of the Federal Government in 1973 and 1976 are outlined. Higher per capita expenditures in Massachusetts than nationwide are attributed to the high proportion of elderly persons, especially of the extremely elderly. Medicaid expenditures are 55 percent higher in Massachusetts than in the rest of the country because of the large number of recipients, particularly the elderly; very high hospital and nursing home charges; and greater use of institutional health services. Massachusetts expenditures for maternal and child health have declined below the national average as a result of special project grants to States and non profit institutions, and of project discontinuation. The decline in Massachusetts expenditures for Government public health activities is due to reductions in funds for alcohol, drug abuse, and mental health program administration. It is concluded that Massachusetts is obtaining an equitable share of Federal health dollars, as the State receives more than expected on the basis of population, but appropriate use of health funds must be assured. A list of Funds Flow reports and four tables are furnished.

HRP-0029326/6 PC A02/MF A01
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Local Government Health Expenditures in Massachusetts. A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Ghanotakis. 1 Nov 77, 22p
See also HRP-0029324; HRP-0029325; HRP-0029327 to HRP-0029340.

Estimates of Massachusetts local government health expenditures from 1973 to 1976 are reported in a Massachusetts Funds Flow Project study. Total local expenditures are obtained from a publication series of the Bureau of the Census; expenditures are broken down by level of government and by types of expenditures, and revenues and net costs of cities and towns are estimated from random subsamples. State employee group health insurance contributions, which are not included in final expenditure calculations, are tabulated by multiplying per employee contributions by total number of employees. Results indicate that local expenditures have been increasing at a rate of 10.4 percent per year; that most of these expenditures are for general hospital care, with revenues at 65 percent of expendiutres in 1976; that Massachusetts local governments spend less per capita than the national average (76 percent of national average), with a lower rate of increase than nationally; and that general hospital costs are higher in cities than in towns, while government public health activities are more expensive in towns than in cities. It is recommended that hospital revenues, which meet almost three-quarters of municipal hospital costs, be investigated further. A list of Funds Flow reports, a source summary, and six tables are supplied.

HRP-0029327/4 PC A02/MF A01
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Finances and Enrollment of Massachusetts Health Maintenance Organizations (HMOs). A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Ghanotakis. 21 Feb 78, 15p
See also HRP-0029324 to HRP-0029326; HRP-0029328 to HRP-0029340.

Enrollment, premium income, and benefit payments of Massachusetts health maintenance organizations (HMO's) from 1973 to 1976 are outlined in a report of the Massachusetts Funds Flow Project. Data are provided by the six HMO's in Massachusetts and the Rhode Island Group Health Association. To integrate enrollees' HMO costs into other health care expenditures, direct HMO services are separated from those of other providers, and the share of HMO benefit payments to outside providers is estimated. Study results indicate a spectacular increase in HMO enrollment, benefit payments, and premium income, but that premium income per HMO enrollee is still about third of the estimated Massachusetts per capita health expenditure; that Massachusetts HMO plans and enrollment have grown faster than nationwide, and that premium icome is higher in Massachusetts than Nationwide, and that premium income is higher in Massachusetts than nationwide but that cost to the plans is lower. HMO's in Massachusetts have been promoted by the Federal HMO Act of 1973 and the Massachusetts HMO Act of 1976. A list of Funds Flow reports, a list of definitions, and four tables are supplied.

HRP-0029328/2 PC A03/MF A01
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
State Government Health Expenditures in Massachusetts. A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Ghanotakis. 15 Mar 78, 37p
See also HRP-0029324 to HRP-0029327; HRP-0029329 to HRP-0029340.

State government gross health expenditures in Massachusetts have increased at a compound rate of 13.3% per year from 1973 to 1976. This rate exceeds the inflation rate, which was 10.0% per year over that period (according to the Consumer Price Index for Boston) and parallels the increase in national expenditures for health services and supplies of 13.8%. It is less, however, than the national increase in public sector expenditures of 17.8% per year over this period. Massachusetts gross state health expenditures were $973 million in 1976. These outlays have increased from $669 million in 1973; a growth of $304 million in three years. They represented 31% and 27% of the gross state expenditures throughout the General Fund in 1976 and 1973 respectively.

HRP-0029329/0 PC A03/MF A01
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Trends in Massachusetts Health Expenditures. A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Ghanotakis. 15 Jul 78, 39p
See also HRP-0029324 to HRP-0029328; HRP-0029330 to HRP-0029340.

Trends in Massachusetts health expenditures, 1973 to 1976, are summarized in a Massachusetts Funds Flow Project report. Total health expenditures (Health services and supplies), public sector expenditures by level of government, and major financing programs (Medicare and Medicaid) are examined. Results show that Massachusetts' total health expenditures exceed the national average; that the Federal Government contributes the larges share, with the State contributing high above the State average; that Medicare dominates Federal expenditures, especially hospitals and physicians' fees for the elderly; that State expenditures go mainly to Medicaid for eligible indigents; that Medicare expenditures are about 7 percent above the national average and Medicaid expenditures from all sources rank seventh among all the States as a result of broad eligibility; that Massachusetts health maintenance organizations have grown 29 percent per year over the period; that Blue Cross-Blue Shield covers an increasing share of health care costs; that the number of acute care hospital beds has dropped, and that hospital costs are considerably above the national average. It is noted that Massachusetts per capital public expenditures have not grown as fast as the national average (12 versus 17 percent). Thirteen tables, two figures, a list of Funds Flow repots, and an appendix containing recommendations for use of health expenditure data are provided.

HRP-0029330/8 PC A02/MF A01
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Expenditures on Professional Health Services in Massachusetts. A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Ghanotakis. 17 Jan 79, 18p
See also HRP-0029324 to HRP-0029329; HRP-0029331 to HRP-0029340. Revision of report dated 11 Sep 78.

Tabulations of Massachusetts expenditures for professional health services in the period 1973 to 1976 are reported in a Massachusetts Funds Flow study. Expenditures for physicians and dentists are calculated by multiplying gross receipts per office-based physicians of dentists by the number of office-based physicians, as listed in Physician Distribution, or of dentists as found in Health Resources Statistics and Health - United States; receipts per office-based physician or dentist are determined by applying an internal Revenue Service ratio of State to national receipts per physician or dentist. Expenditures for other professional services are ascertained by computing a per capita rate instead of a per practitioner national expenditure. Results show that 1976 expenditures for physicians' services amount to 14 percent ($695 million) of total health expenditures, for dentists 6 percent ($292 million), and for other professions 1 percent ($61 million); that Massachusetts spends less than the national average for physicians, with a narrowing gap, more than nationwide for dentists, with a widening gap, and consistently 94.8 percent of the national average for other services; and that the number of physicians is greater than the national average, resulting in lower expenditures per physician. A list of Funds Flow reports, three tables, a bibliography, and four appendixes with provider expenditure tables are furnished.

HRP-0029331/6 PC A02/MF A01
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.

Nursing and Rest Home Expenditures in Massachusetts. A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Ghanotakis.
29 Jan 79, 25p
See also HRP-0029324 to HRP-0029330; HRP-0029332 to HRP-0029340.

Tabulations of Massachusetts nursing and rest home expenditures for the period 1973 to 1976 are presented in a Massachusetts Funds Flow Project report. Revenues are estimated by multiplying the number of care days financed by each payer class (the number of patients for each reported source times number of days in a year) by the reimbursement rate for that payer class (for cost-based payers, the Rate Setting Commission rate; for charge-based payers, the most frequent charge). Expenditures derived from nursing and rest home annual reports. Results indicate that 1976 nursing and rest home expenditures amount to 8 percent ($398 million of total health care expenditures; that nursing home expenditures (skilled nursing and intermediate care) exceed rest home expenditures; that 1976 nursing and rest home revenues are greater than expenditures, with a narrowing gap; that revenues equal expenditures for nursing homes but exceed expenditures for rest homes; that Medicaid provides over half the nursing home revenues, while the Medicare share is less than 2 percent; that the Massachusetts Medicaid share appears slightly higher and the Medicare share slightly lower than the national average; and that differences in expenditures by health systems agencies arise from size and demographic factors. A list of Funds Flow reports, three tables, and an appendix with seven extensive data tables are furnished.

HRP-0029332/4 PC **A02**/MF **A01**
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Expenditures on Eyeglasses and Appliances in Massachusetts. A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Ghanotakis.
15 Sep 78, 13p
See also HRP-0029324 to HRP-0029331; HRP-0029333 to HRP-0029340.

Tabulations of Massachusetts expenditures for eyeglasses and appliances are presented in a Massachusetts Funds Flow Project report. Expenditures for eyeglasses and appliances are estimated by multiplying the number of practicing optometrists (Massachusetts registered optometrists times national ratio of practicing to registered optometrists) by the estimated expenditures per optometrist (the national average gross income per optometrist times 0.956, i.e., lower Massachusetts optometrist income, times 1.48 to extrapolate to all appliance and eyeglass expenditures). Data derived from the Social Security Bulletin, Business Income Tax Returns - Sole Proprietorships, Partnerships, the American Optometric Association 1974 opinion Poll of Economics Survey, Health 1976-1977, Optometric Manpower Resources 1973, and the Massachusetts Registry of Optometry. Results show that Massachusetts' 1976 eyeglass and appliance spending totals 1.7 percent ($81 million) of total State health expenditures; that these expenditures have grown at almost twice the national between 1973 and 1976, becoming 54 percent higher than the national average in 1976, with a widening gap; and the Massachusetts' higher expenditures can be attributed to the higher percentage of elderly persons than nationally and to Medicaid assistance. A list of Fund Flow reports, one table, one appendix, and a bibliography are supplied.

HRP-0029333/2 PC **A02**/MF **A01**
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Expenditures on Drugs and Drug Sundries in Massachusetts. A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Ghanotakis.
25 Jan 79, 13p
See also HRP-0029324 to HRP-0029332; HRP-0029334 to HRP-0029340. Revision of report dated 25 Oct 78.

Tabulations of Massachusetts expenditures for drugs are estimated by multiplying adjusted retail drug store sales by a drug ratio of 0.96624 (1976 Massachusetts drug expenditures divided by 1976 drug store sales) and by a coverage ratio of 0.68779 (1976 national drug expenditures divided by 1976 national drug sales). The data are derived from Surveys of Buying power 1972 to 1977, the 1977 Marketing Management Survey of Buying Power, Market Statistics, Inc., Gibson and Mueller's 1976 National Health Expenditures, the Social Security Bulletin, and the Statistical Abstract of the United States. Results show the 1976 drug expenditures total 6.3 percent ($311.3 million) of total State health spending, and that the drug and drug sundry expenditure growth rate is half the national average. A list of Funds Flow reports, two tables on drug expenditures, and a bibliography are supplied.

HRP-0029334/0 PC **A03**/MF **A01**
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Massachusetts Public Sector Health Expenditures. A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Ghanotakis. 1 Feb 79, 37p
See also HRP-0029324 to HRP-0029333; HRP-0029335 to HRP-0029340.

Tabulations of Massachusetts Public sector health expenditures for the years 1973 to 1976 are reported by the Massachusetts Funds Flow Project. Health expenditures are reported generally, by level of government, by major public program, by type of expenditure, and by program and type of expenditure; State and national expenditures are compared. Results show that Massachusetts adjusted gross health expenditures have increased from $1,380.7 million to $2,055.1 million in the period (11.2 percent per year); that public sector health expenditures amount to 94.8 percent of the total, that Federal Government level expenditures have increased more rapidly than those of other levels; that most public sector program expenditures have increased, with the greatest increases occurring in administration, physicians' services, hospital care, and drugs; that hospital and nursing home care dominate Medicaid expenditures, with hospital care expenditures first for Medicare; and that per capita public sector health outlays are higher for Massachusetts than for the country as a whole because of Medicare and Medicaid as well as hospital/nursing home costs. A list of Funds Flow reports, eight tables, two figures, and an appendix indicating methods and information sources are furnished.

HRP-0029338/1 PC **A02**/MF **A01**
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Expenditures for other Health Services in Massachusetts. A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Chanotakis.
21 Feb 79, 23p
See also HRP-0029324 to HRP-00293237; HRP-0029339, and HRP-0029340.

Massachusetts expenditures for health services not classified as a specific type of medical service for 1973 to 1976 are reported in a Massachusetts Funds Flow Project study. Such expenditures encompass: industrial inplant services, school health services, medical activities in Federal units other than hospitals, nonhealth department neighborhood health centers, and facilities such as family planning clinics, as well as social services (residential and school treatment centers, halfway houses, shelter housing, detoxification centers, and group homes); major State classifications are mental health centers and freestanding health clinics. Data for mental health centers derive from the Office of Health Statistics and the Rate Setting Commission, while expenditures for nonreporting facilities are estimated by number of visits. Expenditures of 27 freestanding clinics not reporting are calculated by selecting every tenth facility of those reporting to obtain a sample of 10 facilities, and estimating expenses accordingly. Results indicate that 1976 expenditures, increasing at a rate of 26.7 percent per year; that there are 228 State mental health clinics (with expenditures of $49.9 million) and 159 freestanding health clinics (with expenditures of $139.7 million); and that the rise in expenditures reflects the increasing emphasis on ambulatory care. A list of Funds Flow reports, nine tables, and a bibliography are furnished.

HRP-0029340/7 PC **A02**/MF **A01**
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Health Expenditures by Philanthropy and Industry. A Report of the Massachusetts Funds Flow Project,
Donald S. Shepard, and Anestis J. Ghanotakis.
28 Feb 79, 12p
See also HRP-0029324 to HRP-0029339.

Health expenditures by Massachusetts philanthropic organizations, 1973 to 1976, are reported in a Massachusetts Funds Flow Project study. Expenditures of organizations such as United Way, Associated Foundation of Greater Boston, private foundations, and industrial plants are obtained by prorating national expenditures on the basis of population and adjusting by a factor of 1.776 to reflect 1975 and 1976 data corrections published in the Social Security Bulletin. Results indicate that 1976 philanthropic expenditures are 1.5 percent ($73.8 million) of estimated total health expenditures, with an annual cumulative rate of 12.2 percent, that individual source expenditures cannot be determined, although a large portion probably consists of free care at hospitals, clinics, and other facilities, and that most 1976 expenditures had gone for hospital care, while the share for other services has declined from 1973 to 1976. A list of Funds Flow reports, a short bibliography, and three tables are furnished.

HRP-0029391/0 PC **A06**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
Employing and Evaluating HSA Executive Directors,
Stanley J. Matek. Feb 79, 113p
Contract PHS-HRA-230-76-0216

Guidelines are presented to aid governing bodies of health systems agencies (HSA's) in the process of employing and evaluating existing or prospective executive directors. They are intended primarily for use by members of HSA search committees, personnel committees, and executive committees. Four substantive sections delineate the guidelines. The first section is concerned with a general understanding of the employing and evaluating process: the HSA as an organization; the nature of the executive director's job in an HSA – required expertise, roles, and interaction requirements; staff relationships; volunteer-executive director relationships; duties and powers of HSA governing body members; and authorities and responsibilities of the HSA executive director. The second section details the approach to employing an executive director and covers agencies' needs, job description development, screening and interviewing, and salary considerations. The third section deals with evaluating an executive director with regard to productivity, conduct, management, personal traits and characteristics, and performance on objectives from previous evaluations. The final section identifies troublesome areas and how to handle them (terminating an executive director and the executive director as a troubleshooter). A bibliography is provided. Appendixes contain forms for use in employing and evaluating HSA executive directors.

HRP-0029709/3 PC **A04**/MF **A01**
National Cancer Inst., Bethesda, MD.
SEER (Surveillance, Epidemiology, and End Results) Program: Cancer Incidence and Mortality in the United States, 1973-1976,
John L. Young, Jr., Ardyce J. Asire, and Earl S. Pollack. 1978, 72p DHEW/PUB/NIH-78-1837

The Surveillance, Epidemiology, and End Results (SEER) Program is a project of the Biometry Branch of the National Cancer Institute. Among the primary objectives of this Program is the provision of detailed information on the incidence of and survival from - and hence the mortality due to - malignant neoplasms within the United States. Information is collected on anatomic site, histologic cell type, and extent of disease at the time of diagnosis of the cancer, demographic characteristics of the patient as well as data on how the diagnosis was established, treatment given, and subsequent vital status of the patient. All data are provided on

a population base so that incidence, survival, and mortality can each be related to the same defined group of individuals at risk.

HRP-0029736/6 PC **A08**/MF **A01**
Texas State Dept. of Health, Austin.
The Texas Glossary of Health Planning Terms and Acronyms.
Nov 78, 165p
Grant PHS-06-P-000207-03

A glossary is presented which contains those terms considered by the Texas Department of Health to be indigenous to the health planning process. The material is intended for use by public health professionals and especially for those individuals involved in implementing the National Health Planning and Resources Development Act of 1974 and the Texas Health Planning and Development Act. In those instances where two or more definitions are provided for one entry, appropriate abbreviations reference the sources of the definitions. A consumer glossary of hospital financing and project review terms is supplied, providing definitions of such terms as accrual basis accounting, acid test ratio, board created endowments, categorical financing, debt retirement schedule, organizational characteristics, and third-party payor. A list of acronyms is included. The appendix contains a list of the estimated persons employed in selected occupations within each health field for 1973. A bibliography is provided. The glossary is without copyright or reproduction restraints.

HRP-0030162/2 PC **A03**/MF **A01**
Birmingham Univ. (England). Health Services Management Centre.
Community Health Councils and Planning in the National Health Service,
Douglas Weller. 1980, 48p

In the reorganized National Health Service a new comprehensive and participation planning system has been introduced, based on a reorganized administrative and management structure, and a new mechanism for representing local opinion, the Community Health Councils (CHCs), which have participation in the planning process as one of their roles. This study seeks to identify and examine some of the important factors which may hinder or facilitate the involvement of CHCs in the planning process. It examines this involvement as it is perceived by CHC secretaries and NHS administrators, two key actors in the relationship between the NHS and CHCs. A glossary of abbreviations is included as an appendix and provides details about the new management structure supplementing those given in the study.

HRP-0030181/2 PC **A16**/MF **A01**
Health Resources Administration, Hyattsville, MD. Office of Graduate Medical Education.
Graduate Medical Education National Advisory Committee to the Secretary. Advance Copy.
Apr 79, 364p

The Health Professions Educational Assistance Act of 1976 (P.L. 94-484) mandated that 50 percent of first-year residency positions be in the primary care specialties. The Congress also expressed its concern over the alleged maldistribution of physicians by specialty and geography and potential surpluses of some specialties, but left further work on those issues to the Secretary of the Department of Health, Education and Welfare who delegated the research and recommendations to the Graduate Medical Education National Advisory Committee, whose final report will be issued in 1980. This interim report reviews the data developed so far on the present physician supply, distribution, and training patterns; women and minorities in medicine; supply projections to 1990; projections on the number of physicians needed in 1990; nonphysician health care providers in pediatrics, family practice, internal medicine, general practice, and obstetrics and gynecology; the relationship of physician fees and income to speciality and location choice; and the financing of graduate medical education. The data are presented in more detail in 51 tables, 12 figures, and 2 charts.

HRP-0030234/9 PC **A03**/MF **A01**
Rhode Island Health Services Research, Inc., Providence.
An Assessment of the Impact of SJPSRO Concurrent Quality Assurance Review on Quality of Care in LTC Facilities. Part II. Appendices,
Sherry Allison-Cooke, and Susan E. Ellis. 1978, 49p
See also Part 1, HRP-0030233.

The Quality of Care Checklist used during the impact study period was developed over the course of eight months and evolved from a general list of topical areas to a well-defined instrument consisting of 43 questions accompanied by specific criteria or instructions for completion. The majority of the developmental work was undertaken by SJPSRO, in particular by the Assistant Director and the physician chairperson of the LTC Committee. SEARCH staff reviewed each draft with comments which were largely oriented toward reformatting, criteria specification, and forms design. Final decisions concerning instrument content, coding instructions, and criteria specification were made by SJPSRO staff and physician advisers. Three factors were identified early on in the deliberations which had to be taken into account before finalizing the instrument: comprehensiveness, objectivity and measurability.

HRP-0030423/8 PC **A03**/MF **A01**
Health Services Council, Inc., Philadelphia, PA. Region III Center for Health Planning.
Techniques for Evaluating and Forecasting Hospital Length of Stay,
Hugo J. Finarelli, Jr. 25 Jun 79, 37p
Contract PHS-HRA-232-78-0112

This paper is intended to assist Health Systems Agencies to determine appropriate lengths of stay for short-stay hospitals within their jurisdiction. Three levels of analysis are anticipated. First, an agency might desire to establish an overall length of stay target for the entire health services area. An overall length of stay target, coupled with an areawide admission rate target, expressed in admissions per 1000 population, would provide the agency with an estimate of total short-stay hospital bed need within the planning area. Population-based estimates of short-stay hospital admissions by diagnosis category, or by diagnosis category and patient age, are needed to establish the overall length of stay target. As few as 18 or 19 major diagnosis categories, such as those used in the International Classification of Diseases (ICD), and as few as four age groups, would be sufficient for this level of analysis.

HRP-0030432/9 PC **A03**/MF **A01**
Bureau of Health Planning and Resources Development, Bethesda, MD. Div. of Facilities Development.
The Hosptial-Based Long-Term Care Unit (Skilled Nursing Facility). Functional Programming Worksheets.
1977, 50p DHEW/PUB/HRA-77-4012

Functional programming worksheets are incorporated in this document to aid in the development of comprehensive plans prior to the modernization, expansion, or construction of hospital-based long-term care units, referred to as skilled nursing facilities. Professional consultants are usually retained in master plan development to assess population characteristics, morbidity and mortality profiles and trends, transportation and travel networks, existing health care services and delivery systems, health care utilization patterns, health manpower resources, needs and gaps in health care resources, service provision and required resources, organizational and management structures of institutions, and feasible goals and objectives and realistic priorities. Planning and programming mechanisms and cost containment issues are crucial in functional programming, in addition to the use of professional consultants. The functional programming methodology incorporates eight worksheets that pertain to: operations and interrelationships; location and logistics; components, configuration, and area requirements; mechanical and electrical requirements; communication and transport; environment; workload and workflow; and staffing. Planning for skilled nursing care must consider infection and accident prevention, safeguarding patients and personnel from fire hazards, making facilities accessible to handicapped persons, providing patient education and inservice training, operating economically and efficiently, and coordinating with hospital and community health services. Benefits of functional programming are enumerated, and procedures for using the worksheets are explained.

HRP-0030641/5 PC **A05**/MF **A01**
Minnesota Systems Research, Inc., Minneapolis.
Planning Area Delineation: A Self Contained Manual for Health Planners.
Mar 76, 125p
Contract PHS-HRA-230-75-0068

This manual was prepared to provide health planners assistance in delineating planning areas as part of the plan development process. This manual was designed to be used by the staff responsible for plan development.

HRP-0030651/4 PC **A04**/MF **A01**
Region VI Center for Health Planning, Houston, TX.
A Methodology for Demonstrating and Assessing the Financial Feasibility of Proposed Health Care Projects,
Donald E. Simmons, and David C. Willis. Jun 79, 69p
Contract PHS-HRA-232-78-0109
Prepared by Social Inquiry Associates, Inc., New Orleans, LA.

A methodology to assist both applicants and reviewers in assessing the financial feasibility of proposed health facilities and services is described. The methodology is based upon a standard proposal format which provides specific data for the reviewer. Criteria considered by the reviewer in the decision process are described. The proposal data include project costs, statistical information, financial information, and financial reports and analysis. Tabular information is presented on required exhibits and completion requirements for different project types and scopes. Instructions are provided for reviewing each of the exhibits. These instructions involve cross-referencing, verification of data, and assessment of validity of projections. Definitions, completion instructions, and blank forms for all information required under the standard proposal format are presented. The methodology is designed to meet information requirements for reviewing financial feasibility under a variety of federally mandated programs.

HRP-0030835/3 PC **A03**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
Problems of Children of School Age (14-18 Years).
1978, 50p ICP/MCH-010
Report on a Working Group, Amsterdam, Netherlands, 6-10 June 1977. See also report dated 1976, HRP-0030836.

A working group was convened by the World Health Organization's Regional Office for Europe to deal with problems of school-age children between 14 and 18 years of age. Considerable emphasis was placed on biological, psychological, social, and sexual characteristics of young people. Specific problems of the age group, as reviewed by the working group, were mortality, morbidity, nutrition, pregnancy, sexually transmitted diseases, substance abuse, suicide, delinquency, and leaving school and finding work. Solutions to problems experienced by youth were evaluated in three areas: (1) educational programs (schools, vocational education, and health education including sex education); (2) health services (primary, secondary, and tertiary health care); and (3) general services (social, legal, and educational services). Recommendations to facilitate understanding of young people and their development, and their need for special services, are made. Supporting data and illustrations are included.

HRP-0030842/9 PC **A03**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
Problems of Children of School Age (10-13 Years).
1977, 42p ICP/MCH-006
Report on a Working Group, Moscow, U.S.S.R., 30 November-3 December 1976.

A working group was convened by the World Health Organization's Regional Office for Europe

to deal with problems of school-age children. Considerable attention was given to biological, psychological, and social characteristics in order to aid in defining problems and identifying solutions. The working group determined that research on the growth and development of children should focus on the influence of environmental factors. It should include the study of functional components and the interdisciplinary study of psychological and social effects of rapid growth and development during adolescence, as well as a search for better parameters of growth and sexual maturation, and provide for improved collaboration between researchers from various disciplines. School-based education, vocational education, health education, and sex education were considered as viable solutions to problems of school-age children, along with the provision of appropriate health services. Cooperation and consultation between school administrators, parents, and health professionals are stressed. Recommendations to facilitate the growth and development of these children are offered. Supporting data are provided.

HRP-0030850/2 PC **A04**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
Use of Operational Research in European Health Services.
1976, 74p ICP/SHS-028
Report on a Working Group, Sofia, Bulgaria, 7-11 July 1975.

A working group was convened in 1975 by the World Health Organization's (WHO's) Regional Office for Europe to examine the growth of operational research and its application to health service problems. Four case studies wre circulated, prior to deliberations of the working group, that dealt with the development of a mass screening program, the care of elderly persons, the use of hospital beds and factors influencing hospital costs, and the conceptual basis of a model for optimizing regional public health services. Other areas of interest were the development of operational research in health services, the relationship between policymakers and operational research scientists, and the role of the WHO in operational research. The working group defined operational research as being primarily concerned with the implementation of change and with all relevant aspects of a decision problem, rather than with the derivation of scientific theories. Operational research was viewed as science to support management and as applicable in principle to decisionmaking in any field, including health services. Issues raised during the meeting of the working group focused on the organizational position of operational research, the initiation of operational research studies, implementation and change, and education and training in operational research techniques. Recommendations of the working group and a list of references are presented. Annexes contain additional information on topics discussed by the working group.

HRP-0031071/4 PC **A05**/MF **A01**
South Carolina Office of Cooperative Health Statistics, Columbia. Div. of Research and Statistical Services.
Dentists, Dental Hygienists and Dental Technicians, South Carolina 1978.
Apr 78, 95p
Contract PHS-HRA-233-78-2142
Sponsored in part by South Carolina State Board of Dentistry, Columbia.

The Cooperative Health Statistics System is a joint effort among government, the private health sector, and providers and users of health statistics, to develop quality, timely, unduplicative systems for collecting and disseminating relevant information for health planning, evaluation, and management purposes. The basic philosophy of the Cooperative Health Statistics System has been that core information can be collected for multiple users in one system provided that system is responsive to changing user needs, the quality and timeliness of the information can be assured, and the confidentiality of individual-identifiable information is not breached. The components of the Cooperative Health Statistics System in South Carolina include: Health Manpower Statistics; Health Facilities Statistics; Vital Statistics; Hospital Discharge Data; Long-Term Care Data; and Health Manpower Educational Data. Funds to support the Cooperative Health Statistics System are provided through contractual arrangements with the National Center for Health Statistics, Office of Health Policy, Research, and Statistics Department of Health, Education, and Welfare and the State of South Carolina.

HRP-0031229/8 PC **A09**/MF **A01**
Arkansas State Health Planning and Development Agency, Little Rock.
Comprehensive Study of Health Manpower Required Within the State of Arkansas.
Final rept. 5 Nov 73-30 Jun 77.
Jun 77, 186p
Contract N01-MB-4-4000

The intent of this document is to provide a final evaluative report of the Arkansas experience directed toward the development of a state linkage system for health manpower planning. The State Linkage System is a mechanism (1) for the comprehensive study of health manpower requirements within a State and the relationship of these requirements to the existing educational programs for training health workers; and (2) for bringing together (linking) those elements in the State which have a significant impact on health manpower planning and production. The resource allocation system, the health manpower planning processes and the production systems should be included in the linkage.

HRP-0031231/4 PC **A10**/MF **A01**
Alpha Center for Health Planning, Bethesda, MD.
HSA (Health Systems Agencies) Resource Workbook for the Review and Approval of Federal Funds,
Phyllis E. Kaye, and M. Barbara Campbell. Jun 79, 207p
Contract PHS-HRA-232-78-0113

This workbook gives Region II Health Systems Agencies a place to conveniently find some important information about federal grant programs. It does not go into detail about any single program, but it does give an idea of what it is you need to find out before conducting a review. It was prepared for HEW Region II, (New York, New Jersey, Puerto Rico, and the Virgin Islands). While the format may be useful other places, the procedures and requirements will be different in other Regions. It was compiled from a variety of published sources and from interviews over a six-month period. Hundreds of pages were sifted and sorted through, and while the authors have made every attempt to be accurate, there is always a potential for error. This is especially true since programs change rapidly; it would not be possible to have absolutely every one up-to-date.

HRP-0031346/0 PC **A08**/MF **A01**
New Jersey Dept. of Higher Education, Trenton. Office of Health Professions Education.
A Study of the Future Scope and Cost of Health Professions Education in New Jersey.
Oct 78, 160p

This study was commissioned by the New Jersey State Department of Higher Education to analyze the need for and cost of educating qualified health professionals. While the study emphasized resource maximization and cost-effectiveness and the importance of maintaining an equitable balance in the support of higher education, consideration was also given to the quality and cost of health care and the role of educational preparation in this regard. Health manpower education was broadly defined to include three groups of activities: educational and patient care units at the College of Medicine and Dentistry of New Jersey for which the Department of Higher Education has management and budgetary responsibility; so-called 'extraordinary' health manpower education programs discretely funded by the department; and allied health education programs. Analysis covers the education of physicians, dentists, nurses, veterinarians, optometrists, and allied health professionals and major issues in financing medical and dental education. Recommendations concerning the development of health manpower education programs are made; if recommendations are implemented, State support for health manpower education is expected to increase from $65.5 million in fiscal year 1979 to $91.1 million in fiscal year 1988. The need to reduce the high cost of medical education is discussed. Supporting data are provided.

HRP-0031406/2 PC **A05**/MF **A01**
Puget Sound Health Systems Agency, Seattle, WA.
Inpatient Statistics and Utilization Trends of Northwest Washington Hospitals.
Rept. no. 5,
Linda Styron, and Mary Webster. Aug 79, 82p
Contract PHS-HRA-10-P-550002-04

This report describes 1978 inpatient use of community general hospitals (all except federal and special purpose hospitals) in the 10 counties of Northwest Washington Health Service Area No. 1 and examines the trends in hospital utilization and population growth since 1973. The most recent annual (1978) volumes of community general hospitals in the health service area are compared to licensed and set-up bed capacities of the hospitals. The average percent occupancy of the area's 6,946 set-up beds was 70%, ranging from 72% in King County (the most urban subarea of the region) to 55% in the North Olympic (most rural) subarea. These hospitals averaged 3.0 set-up beds per thousand population, well under the federal guideline of 4.0 per thousand. A positive correlation between size of hospital and rate of occupancy is illustrated. In general the larger the hospital the higher the occupancy.

HRP-0031638/0 PC **A04**/MF **A01**
Bureau of Health Facilities Financing, Compliance and Conversion, Hyattsville, MD.
Energy Issues in Health.
1979, 57p DHEW/PUB/HRA-79-14510

This report is intended to stimulate wide discussion of relevant energy issues in health care. Medical and diagnostic equipment and modern facilities cannot operate without energy. Because the health care delivery system is an energy-intensive as it is labor-intensive, every output requires manpower and energy inputs. Regional power disruptions combined with extreme weather conditions are significant considerations, as well as the continued proliferation of disposable petroleum-derived projects and increasing direct fuel costs. Energy costs affect both individuals and institutions. Specific energy issues are discussed in three areas: (1) health planning (health systems agency role in energy management, energy shortages, and health care for the disadvantaged); (2) health care administrators (who should pay for hospital energy management, the role of hospital administrators in energy management, and the case for high hospital priority in fuel allocations); and (3) research and data (petroleum and petrochemicals and their relation to health care and the potential impact of energy management activities in hospitals).

HRP-0101901/7 PC **A07**/MF **A01**
Government Studies and Systems, Inc., Philadelphia, PA.
Methods to Determine Geographic/Population Boundaries for Specific Health Services: Part I. State-Of-The-Art Report. Part II. Alternative Methods.
Jul 80, 147p DHHS/PUB/HRA-80-14015, BHP/HPMTS-19
Contract PHS-HRA-231-77-0055
See also report dated 5 Jun 78, HRP-0900357, and HRP-0301701.

In Part I conclusions are drawn from an extensive search of the literature that geographic/population boundary analysis is needed by health planners to define appropriate geographic units for the location and allocation of health services. This analysis is basic to the location of health care providers and institutions in areas where they will be accessible to the appropriate numbers of persons in need. Patient origin studies can be used to gather data about patient-to-provider flow patterns, but refinements are needed when considering specialized services. Location/allocation problems involve travel time/distance factors, demand factors, cost factors, and others concerning facility parameters (size, number or capacity of the facility), patient behaviors, provider behavior, and miscellaneous initial conditions of interdependencies and interactions among service facilities. Two methods used

for solving problems of location/allocation are the optimization methods, which find a best solution to a problem, and the heuristic methods, which use a set of decision rules to find good solutions without guaranteeing optimality. Linear programming is the most basic and widely used of the optimization techniques, which are largely confined to emergency services. Heuristic methods address general districting problems, equitable distribution of hospital services, and appropriate regional definition for health services delivery and analysis. The four methods described in Part II of this report include location, allocation, optimization, and heuristic approaches in the illustrations of how each method can be used in determining geographic/population boundaries for health services. References and exhibits are included for the methods. A companion volume 'Methods to Determine Geographic/Population Boundaries: An Annotated Bibliography' is available (see HRP-0301701).

HRP-0901630/4 PC **A25**/MF **A01**
Central Massachusetts Health Systems Agency, Inc., Shrewsbury.
Health Systems Plan and Annual Implementation Plan for 1979. Health Service Area 2 Massachusetts. Volume 2.
1979, 600p
See also Appendices, HRP-0901632 and Volume 1, HRP-0901631. Sponsored in part by Bureau of Health Planning, Hyattsville, MD.Portions of this document are not fully legible.

The mission of the Central Massachusetts Health Systems Agency is to improve the health of the population it serves. This is accomplished by planning and implementing changes in the health system so that the services are delivered in a more accessible, acceptable, economical, continuous, and effective manner.

HRP-0901631/2 PC **A25**/MF **A01**
Central Massachusetts Health Systems Agency, Inc., Shrewsbury.
Health Systems Plan and Annual Implementation Plan for 1979. Health Service Area 2 Massachusetts. Volume 1. 2nd Edition.
1979, 588p
See also Appendices, HRP-0901632, Volume 2, HRP-0901630, and report dated Jul 78, HRP-0901000. Sponsored in part by Bureau of Health Planning, Hyattsville, MD.Portions of this document are not fully legible.

CMHSA has the responsibility of promoting the development of needed health services, personnel and facilities; reducing documented deficiencies and inefficiences in the health care system; and, promoting a healthful physical environment and other factors that will lead to the improvement of the health of Central Massachusetts residents. This second Health Systems Plan of Central Massachusetts is the CMHSA's formal and detailed expression of its approach to meeting these overall goals.

HRP-0901632/0 PC **A11**/MF **A01**
Central Massachusetts Health Systems Agency, Inc., Shrewsbury.
Health Systems Plan and Annual Implementation Plan for 1979. Health Service Area 2 Massachusetts. Appendices.
1979, 229p
See also Volume 1, HRP-0901631 and Volume 2, HRP-0901630. Sponsored in part by Bureau of Health Planning, Hyattsville, MD.Portions of this document are not fully legible.

The volume contains the appendices to the Health System Plan/Annual Implementation Plan 1979-84 for Central Massachusetts.

HRP-0902291/4 PC **A04**/MF **A01**
Health and Welfare Canada, Ottawa (Ontario).
Evaluation and Space Programming Methodology for the Admitting Function - Series 13.
Nov 79, 72p
See also HRP-0902279 thru HRP-0902290, HRP-0902292, and HRP-0902293.

The objective of this document is to present a methodology and criteria to evaluate and program space for the hospital admitting function. The methodology assumes that a detailed functional program has been developed and is readily available, although some aspects of the functional program are discussed in this manual as they relate specifically to space requirements. The application of this methodology will have the greatest pragmatic effect through ultimately involving the talents and expertise of the several disciplines of the design team, including department staff, hospital management, programming consultant, architect, and engineer. With a multi-disciplinary approach, the programming task should be completed in an effective manner.

HRP-0902315/1 PC **A05**/MF **A01**
Southeastern Wisconsin Health Systems Agency, Inc., Milwaukee.
Annual Implementation Plan for 1980-1981. Health Service Area 2 Wisconsin.
20 Dec 79, 93p
Grant PHS-05-P-000211-04
See also HRP-0901674, HRP-0902316, and HRP-0902317.

The AIP is a statement of short-range objectives (one year time frame) which the HSA would like to see completed or begun within the next year as an initial step in accomplishing the long-range recommended actions of the HSP. The activities or steps required to implement the long-range recommended actions of the HSP become the objectives of the AIP. While these AIP objectives need not be achievable in one year, the AIP includes short-range recommended actions which the HSA intends to promote during the year and describes the expected effects of these actions on achievement of the AIP's objectives. The AIP also specifies resource requirements and discusses the feasibility of implementing the short-range recommended actions. The AIP is above all a plan for the community, to be achieved by the joint efforts of SEWHSA and organizations within the southeastern Wisconsin Community.

HRP-0902316/9 PC **A99**/MF **A01**
Southeastern Wisconsin Health Systems Agency, Inc., Milwaukee.
Health Systems Plan for 1980-1981. Health Service Area 2 Wisconsin. 3rd Edition.
15 Nov 79, 988p
Grant PHS-05-P-000211-04
See also HRP-0902315 and HRP-0902317.

The Health Systems Plan sets forth long range goals and objectives for reduction of death or disability and improvements in health service delivery. It identifies specific recommended actions and the facilities, manpower, equipment and finances which will be required to carry out the objectives. Wherever possible, it identifies the organizations or types of organizations which should be responsible for initiating activities to achieve the goals and objectives.

HRP-0902317/7 PC **A05**/MF **A01**
Southeastern Wisconsin Health Systems Agency, Inc., Milwaukee.
Health Systems Plan for 1980-1981. Health Service Area 2 Wisconsin. Summary.
15 Nov 79, 93p
Grant PHS-05-P-000211-04
See also HRP-0902315 and HRP-0902316.

The summary has been prepared to provide interested members of the public with a quick reference to the goals and objectives presented in the 1980-1981 Health Systems Plan for Southeastern Wisconsin (HSP). The HSP includes extensive research and analysis on which goals and objectives are based. What the summary will provide is a brief synopsis of the general rationale, recommended actions, responsible parties, and costs associated with each goal and objective.

HRP-0902396/1 PC **A03**/MF **A01**
West Michigan Health Systems Agency, Grand Rapids.
Study of the Kent County Emergency Medical Services System.
1979, 43p STUDY-79/12

This study analyzes the Kent County emergency Medical Services (EMS) system. The system is compared to other systems around the state, the nation and Canada as well as to various alternatives developed in the study. The analysis includes looking at factors such as cost, response time, public access to the system, emergency vehicle to population ratios, emergency medical technician (EMT) skill maintenance, method of finance (publicly support or private enterprise) and public and political acceptance of the system. The study was done at the request of the Association of Grand Rapids Area Governments (AGRAG).

HRP-0902401/9 PC **A04**/MF **A01**
North Olympic Health Planning Council, Port Angeles, WA.
Hospital Development Guide for the North Olympic Region.
24 Oct 79, 60p
Grant PHS-HRA-10-P-55000-20-4

The purpose of this document is to provide some necessary information for the future review of hospitals and hospital service development and expansion proposals; to provide North Olympic residents with information about existing hospital services and to provide a rural perspective to the regional planning in the area of hospitals and acute care. There are three hospitals in the North Olympic Health Planning Region. Olympic Memorial Hospital in Port Angeles is the largest of the three with eighty-six licensed beds; Jefferson General in Port Townsend has thirty set-up acute care beds and Forks Community Hospital has twenty-five set-up beds. The hospitals are located more than an hour's drive from one another and from other hospitals outside of the region.

HRP-0902403/5 PC **A05**/MF **A01**
Birmingham Regional Health Systems Agency, Inc., AL. Obstetrical Task Force.
An Obstetrical Care Study with Recommendations for Jefferson County, Alabama,
Emmett Johnson, Robert Chapman, Maureen Kelly, Mary Tiller, and Ronald Henderson. May 80, 79p
Grant PHS-04-P-0000209-05-0

In October, 1978, the Executive Committee of the Birmingham Regional Health Systems Agency (BRHSA) established an Obstetrical Task Force under the direction of the Health Plan and Resource Development Committee. The Obstetrical Task Force was charged to formulate an obstetrical care study for Jefferson County consistent with the 1978 Health Systems Plan (HSP) and the 1978-79 Annual Implementation Plan (AIP). The charge further stated that this study be consistent with the HSP objectives and the National Health Planning Guidelines which limit hospitals providing obstetrical care (level II and III) to those institutions approximating a minimum of 1500 births annually. Also, the Obstetrical Task Force was instructed to take into consideration neonatal care and its relationship to obstetrical care as well as factors impacting on other related medical services. The charge also suggested the possibility that the obstetrical care study may result in modification to the HSP as well as suggested modifications to the local health care delivery system.

HRP-0902404/3 PC **A08**/MF **A01**
Michigan Dept. of Public Health, Lansing.
Priority Health Problems of Michigan for 1979-80.
Aug 79, 160p

To examine the health problems of Michigan, and to determine which should be considered priority health problems, the following criteria were used: The frequency of occurrence, or the prevalence of the problem, or the potential frequency or prevalence of the problem in the absence of preventive or control measures; The impact of the problem; The severity of impact of the problem on an individual, including health and economic factors; limitations in normal daily activity; limitations in education and employment; pain, suffering, or disability; and costs of care; The severity of impact of the problem on the community as a whole, including cost to the community, contagion, contamination of the environment, and loss of labor. The threat or seriousness of the problem as perceived by the population of the state; and Community concern about the problem. The report organizes the problems into three groups: health status problems (those which contribute to morbidity and mortality), environmental health problems (those which con-

tribute to morbidity and mortality), environmental health problems (those which hinder the assurance of a healthful environment), and health system problems (those which hinder the availability and accessibility of quality health services at a reasonable cost).

HRP-0902409/2 PC **A24**/MF **A01**
Central Virginia Health Systems Agency, Inc., Richmond.
Health Systems Plan, 1980-1984 and Annual Implementation Plan, 1980 for Virginia Health Service Area IV.
1979, 571p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The Plans contain a detailed statement of goals, objectives, and actions to achieve quality health services that will be available and accessible, at reasonable cost, for all residents of Central Virginia. The Health Systems Plan, 1980-84 and the 1980 Annual Implementation Plan are further products of the development of health planning in Central Virginia. In them, refinements have been made in the statement of goals and further progress has been made in the selection of objectives to meet priority needs. New sections have been included on child abuse, burn care, diagnostic radiology services, rural health, and primary care satellite centers. Findings from the Virginia Health Survey are included and a description of the reimbursement system added. New sections are included on implementation strategies, recommended actions, and evaluation. In the Annual Implementation Plan the activities of a number of voluntary health organizations are incorporated for the first time.

HRP-0902410/0 PC **A14**/MF **A01**
Southwest Missouri Health Systems Agency, Springfield.
Health Systems Plan and Annual Implementation Plan for 1980. Health Service Area 4 Missouri. 3rd Edition.
1980, 323p
Grant PHS-07-P-000065-04-1
See also report dated Jan 78, HRP-0901076.

The purpose of the Health Systems Plan is to promote at the local level appropriate health care services which will improve levels of health status, assure a healthful environment, and provide for the availability and acessibility of quality health care in a manner which fosters continuity at a reasonable cost for residents of Area IV. The Health Systems Plan is a statement of desired achievements or improvement in the health status of Area IV residents and in the health systems serving the population. It also states how these achievements may be fulfilled through recommended actions, and provides a framework for health systems agency actions in reviewing proposed health systems changes, reduce documented deficiencies and inefficiencies within Area IV and promote desired achievements to meet identified needs. The goals and objectives set forth a foundation for the development of the short term (one year) objectives of the Annual Implementation Plan. The Health Systems Plan is a guide to health systems changes over time, and provides an effective planning organizational and communications bridge with the State Health Planning and Development Agency, the Statewide Health Coordinating Council and other related agencies at state and local levels. It also describes local health care needs and priorities as they compare with the National Health Priorities set forth in Section 1502 of Public Law 93-641.

HRP-0902412/6 PC **A14**/MF **A01**
Florida Gulf Health Systems Agency, Inc., St. Petersburg.
Health Systems Plan, 1980.
1980, 320p
Grant PHS-04-P-000226-04-1
See also report dated Dec 78, HRP-0901714.

The HSP is a 5-year guide for the development of area health resources and is a detailed statement of goals that (1) describes a healthful environment, health system and health status in the area; (2) is responsive to the unique needs of the area; and (3) is consistent with the national guidelines for health planning policy. The AIP is developed to serve as a one-year guide to implementation of the HSP. The HSP and AIP are periodic reports reflecting needs assessment, progress to date, and appropriate future activities.

HRP-0902413/4 PC **A04**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
Issues in Governing Body Selection and Composition.
Aug 80, 52p
Contract PHS-HRA-232-79-0036

Each Health Systems Agency (HSA) developed and funded under provisions of Title XV of the Federal Public Health Service Act must have a governing body that meets minimum statutory and regulatory requirements. The governing body, made up of community representatives, is responsible for carrying out the programs assigned HSAs under various Federal statutes. Title XV, as amended by P.L. 96-79 in 1979, is very specific concerning aspects of composition and selection of HSA governing bodies. The composition requirements are intended to insure, to the extent practicable, that the governing body is representative of the health service area served by the HSA. The selection requirements have been placed in statute to prevent self-perpetuation by HSA governing bodies. The Congress concluded that self-perpetuation holds great potential for abuse of an HSA's powers through a small group gaining control of the organization's corporate structure. In this document, the statutory requirements for the selection of governing body members are reviewed; the elements of a selection process are discussed; and recommendations are made to assist HSAs in developing a method for governing body selection which meets Federal statutory, regulatory, and policy requirements. Appended are capsule descriptions of governing body selection methods as well as checklists to assist HSA's in determining whether their methods meet minimum Federal requirements.

HRP-0902414/2 PC **A13**/MF **A01**
Southeast Georgia Health Systems Agency, Brunswick.
Health Systems Plan and Annual Implementation Plan for 1980. Health Service Area 7 Georgia. Third Edition.
Jan 80, 279p
Grant PHS-04-P-000225-04
See also report dated 1977, HRP-0901091. Errata sheet inserted.

The document is to be used by the southeast Georgia community and the Southeast Georgia Health Systems Agency as a guide to decisions affecting the health of the residents of the area. The goals, objectives, and recommended actions of the HSP will be used by the SEGHSA, along with related criteria and standards, in the review and approval function for federal funds, recommendations on capital expenditures, and the appropriateness of institutional health services. The Plan will be used by the health providers of the area in formulating projects and proposals to meet the needs identified in the Plan and more specifically accomplish the objectives stated in the related Annual Implementation Plan (AIP). This revised Health Systems Plan was prepared during 1979 and focuses on the 1980-1984 period. The Annual Implementation Plan covers calendar year 1980.

HRP-0902416/7 PC **A03**/MF **A01**
Health Systems Agency of Northeast Florida Area 3, Inc., Jacksonville.
Annual Implementation Plan for 1980. Health Service Area 3 Florida.
25 Oct 79, 50p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. See also HRP-0901111 and HRP-0902417.

The Annual Implementation Plan identifies the specific priority short-range objectives upon which the community wishes to act during the ensuing year. It serves as a reference point for making and modifying decisions concerning the future development of health facilities and services. The AIP encourages, consumers, providers and government to take immediate action which can have a substantial impact on the health system's performance and on the health of area residents. The AIP guides the Health Systems Agency in its cooperative activities with community organizations to achieve priority objectives. These agency activities include technical assistance, the joint development of specific plans and projects, and the award of mini-grants and contracts (when funds become available). The AIP provides a basis for the Agency's review and comment functions and for recommending medical facility construction, modernization and conversion projects.

HRP-0902417/5 PC **A23**/MF **A01**
Health Systems Agency of Northeast Florida Area 3, Inc., Jacksonville.
Health Systems Plan for 1979-1984. Health Service Area 3 Florida. 3rd Edition.
25 Oct 79, 533p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. See also HRP-0901110 and HRP-0902416.

The Health Systems Plan is divided into two principal components. The first component deals with the long range goals, objectives and recommended actions. The second component is the support document which contains the background and analysis materials used in formulating the goals, objectives and recommendations contained in the first component.

HRP-0902418/3 PC **A17**/MF **A01**
ARCHA Health Systems Agency, Inc., Johnson City, TN.
Health Systems Plan for 1980. Health Service Area 1 Tennessee. 3rd Edition.
1980, 393p
Grant PHS-04-P-000267-02-0
See also HRP-0902419, HRP-0902420, and HRP-0902421.

The plan provides a basis to promote a healthful environment, to review proposed health systems changes, to reduce documented deficiencies, and to promote desired achievements which meet identified needs of the community.

HRP-0902419/1 PC **A04**/MF **A01**
ARCHA Health Systems Agency, Inc., Johnson City, TN.
Annual Implementation Plan for 1980. Health Service Area 1 Tennessee.
1980, 53p
Grant PHS-04-P-000267-02-0
See also HRP-0902418, HRP-0902420, and HRP-0902421.

The Annual Implementation Plan (AIP) is an expression of changes the community wishes to accomplish during the ensuing year in the health systems and the environment, and which will promote the community's goals adopted in the Health Systems Plan.

HRP-0902420/9 PC **A06**/MF **A01**
ARCHA Health Systems Agency, Inc., Johnson City, TN.
Health Systems Plan for 1980. Health Service Area 1 Tennessee. Data Supplement.
1980, 103p
Grant PHS-04-P-000267-02-0
See also HRP-0902241, HRP-0902418, HRP-0902419, and HRP-0902421.

The report contains statistical tables supplementing the Health Systems Plan.

HRP-0902421/7 PC **A03**/MF **A01**
ARCHA Health Systems Agency, Inc., Johnson City, TN.
Health Systems Plan for 1980. Health Service Area 1 Tennessee. Summary.
1980, 42p
Grant PHS-04-P-000267-02-0
See also HRP-0902242, HRP-0902418, HRP-0902419, and HRP-0902420.

The ARCHA Health Systems Plan 1979-1984 is a 350-page document containing detailed data on the demographic and socioeconomic information of the area, the health manpower and facilities resources, populations at risk for specific health hazards, and specific recommendations for improving health status and services.

HRP-0902422/5 PC **A07**/MF **A01**
Orange County Health Planning Council, Tustin, CA.

Orange County Hospital Charges and Costs: Supplement to 1979 Inventory of Health Services and Facilities.
c1979, 133p
Grant PHS-09-P-000998-04-0
See also HRP-0027295.

This report, a supplement to the 1979 Inventory of Health Services and Facilities, was developed by the Orange County Health Planning Council (OCHPC), the health systems agency (HSA) for Orange County. It was written in response to the Council's mandate under Public Law 93-641, the National Health Planning and Resources Development Act of 1974, to examine health care costs. To this end, it is an attempt to understand the environment in which changes in health care costs occur as well as the system dynamics underlying these cost changes. This document is based on annual reports submitted by acute care hospitals to the California Health Facilities Commission (CHFC). From the standpoint of economics, it is concerned with how charges for and costs of health care services varied as output (the quantity of service delivered) changed between fiscal years 1975 and 1976. Because of the limited availability of data, this study was confined to a discussion of acute care hospitals and primarily general acute care hospitals. As future annual reports are obtained from CHFC, trends will be observable and more detailed analysis will be possible. This document, therefore, serves as a baseline from which further analysis can be developed as data become available.

IAEA-R-1963-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Value of the Indirect Immunoradiometric Assay of Serum alpha - Fetoprotein in Detecting Liver Regeneration and Neoplastic Transformation in Chronic Liver Disease. Part of a Coordinated Programme on in Vitro Assay Techniques. Final Report for the Period 1 June 1977 - 31 July 1979.
N. Voiculetz. Jul 79, 13p
U.S. Sales Only.

To investigate the concentration of alpha fetoprotein (AFP) in different liver diseases and above all in liver cancer the immunoradiometric assay was utilized. The results of AFP studies were compared with regeneration index, biastic T lymphocytes transformation as well as other morphological and biochemical data. The results of the investigations indicated that: 38% of chronic benign hepatopathies displayed the values of serum AFP in normal ranges, 54% were in the range of 41 - 200ng/ml, and 8% showed 200 and more ng/ml. The most important conclusion from the work performed was that the elevation of serum AFP level in the evaluation of chronic hepatopathies, especially in cirrhoses, appears as an index of malignancy. (Atomindex citation 11:508532)

INIS-mf-5494 PC **A03**/MF **A01**
Medizinische Hochschule Luebeck (Germany, F.R.). 1. Medizinische Klinik.
Investigations of the Enterohepatic Bile Salt Circulation Using the exp 14 C-Glycol Cholate/ exp 14 CO sub 2 Exhalation Test in Persons with Billroth-II Stomach Resection.
G. Raguse. 19 Jan 78, 31p
In German. Thesis.
U.S. Sales Only.

A exp 14 C-glycol cholate/ exp 14 CO sub 2 exhalation test was carried out in 34 normal persons, 32 persons with a Billroth-II resection stomach, and 9 patients with a Billroth-II resection stomach and gastroenterological disorders. Persons with a normal stomach function after B-II resection and an objective lack of symptoms of a gastroenterological disease had normal test results in all cases. In 7 of the 9 B-II resected patients with various disorders or diseases of the intestinal tract, the liver, gallbladder, or pancreas, exp 14 CO sub 2 exhalation was pathologically increased. In agreement with the hypothesis that deconjugation of bile salts can only be caused by bacterial enzymes, a pathological finding can be explained by a pathological bacteria population in the upper intestinal tract or by a loss of bile salts. However, the clinical importance of pathological test results remains doubtful as 3 out of the 7 patients with pathological results presented with clinical symptoms. (Atomindex citation 11:513958)

IPNO-78-09 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
1978 Progress Report of the Radioprotection Medical Section.
1979, 22p
In French.
U.S. Sales Only.

The medical section of the Nuclear Physics Institute in Orsay reports on the medical survey of the staff for the year 1978. (Atomindex citation 11:508417)

NIRS-16 PC **A04**/MF **A01**
National Inst. of Radiological Sciences, Chiba (Japan).
Annual Report of National Institute of Radiological Sciences for the Period from April 1976 to March 1977.
Sep 77, 72p
U.S. Sales Only.

Works made in the NIRS from April 1976 to March 1977 are described in respective short summaries, of which full reports are made in journals. Concern of general people about the level of radioactivity in the environment and the effect of low level radiation is rising. Covered by NIRS's efforts are physical sciences, biology (biochemistry and biophysics, physiology, genetics, etc.), medicine, and environment. (Atomindex citation 09:412284)

PB80-815715 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Assessment and Quality Assurance: Nursing Care. 1964-August, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Aug 80,
Elizabeth A. Harrison. Oct 80, 228p
Supersedes NTIS/PS-79/1040 and NTIS/PS-78/0954.

Selected abstracts are presented on quality assurance programs for nursing care in ambulatory and inpatient settings. Topics covered are nursing audits, outcome criteria, peer review, measurement methodologies for quality of care, and utilization of nursing protocols and medical records for patient care monitoring. Reports have been excluded on nurse practitioners and nurse mid-wives, as well as licensure, certification, and education of nurses. These topics are covered in the bibliographic series on Health Manpower. (This updated bibliography contains 210 citations, 41 of which are new entries to the previous edition.)

PB80-815723 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Assessment of Quality Assurance: Medical Care. 1964-August, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Aug 80,
Elizabeth A. Harrison. Oct 80, 166p
Supersedes NTIS/PS-79/1039 and NTIS/PS-78/0953.

A compilation of references is presented on quality assurance programs for hospital and ambulatory care by physicians and physician extenders. Quality assessment activities such as utilization review, peer review, medical audits, and measurement methodologies for medical care structure, process, and outcomes are covered. The roles of Professional Standards Review Organizations (PSRO's) and the Joint Commission on Accreditation of Hospitals in quality assurance are discussed. Reports have been excluded on licensure, creditation, and education, and can be found in the bibliography series on Health Manpower. (This updated bibliography contains 158 citations, 15 of which are new entries to the previous edition.)

PB80-815731 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Assessment and Quality Assurance: Long Term Care. 1967-August, 1980 (Citations from the NTIS Data Base).
Rept. for 1967-Aug 80,
Elizabeth A. Harrison. Oct 80, 114p
Supersedes NTIS/PS-79/1038 and NTIS/PS-78/0952.

Studies are cited on quality assurance programs, quality assessment methodologies, peer review, and utilization review in long term care facilities. Medical review requirements for facilities receiving Medicaid and Medicare patients are discussed. (This updated bibliography contains 106 citations, 6 of which are new entries to the previous edition.)

PB80-815749 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Assessment and Quality Assurance: Mental Health Care. 1970-August, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 80,
Elizabeth A. Harrison. Oct 80, 115p
Supersedes NTIS/PS-79/1041 and NTIS/PS-78/0955.

Research studies are cited on the evaluation of mental health programs and on the effectiveness and efficiency of treatment approaches to patient care. The bibliography covers methodologies for program monitoring and evaluation; procedures for assessing quality of care; standards for facilities, personnel, and services; accountability and peer review. Settings studied are community health centers, residential centers, and mental hospitals. Studies on cost-effectiveness of mental health programs are excluded. (This updated bibliography contains 107 citations, 7 of which are new entries to the previous edition.)

PB80-851116 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Angiography. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Aug 80, 72p
NERACUSGNT0495
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations presented in this bibliography cover development and testing of ultrasound instrumentation methods for detection and assessment of atherosclerosis in carotid and femoral arteries of living patients. Computer analysis of treadmill exercise electrocardiographic, radiopharmaceutical development, and animal experimentations are also involved in this bibliography. (Contains 053 citations.)

PB80-851124 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Angiography. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Thomas H. Jones. Aug 80, 79p
NERACEDBNT0495
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover the use of angiography and ultrasonography in diagnosis, computed tomography, radionuclide bolus angiography, intraarterial tolazoline, and scintigraphy. Ioxaglate, a new low osmolar contrast medium, is also included in this bibliography. (Contains 064 citations.)

PB80-851140 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pneumoconiosis. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Aug 80, 121p
NERACUSGNT0421
Sponsored in part by National Technical Information Service, Springfield, VA.

These abstracts deal with worldwide research reports on the general topic of pneumoconiosis. The emphasis is on 'coal miners pneumoconiosis' (anthracosis) and silicosis, however, there are many references to other types such as 'byssinosis', 'asbestosis' and 'aluminosis'. The reports cover the detection/diagnosis, pathology, epide-

miology and preventative aspects, as well as the social, legal and economic implications of this condition. (Contains 096 citations.)

PB80-851298 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Dental Alloys. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 57p NERACEI NT0497
Sponsored in part by National Technical Information Service, Springfield, VA.

These reports deal with the topic of dental alloys and amalgams. Included are the areas of metallography, amalgamation and general properties, production, and corrosion resistance of dental casting alloys. These alloys are primarily gold, silver, or nickel based. However, there are many other types reported. (Contains 046 citations.)

PB80-851306 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computer Technology in Medicine. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Thomas H. Jones. Jun 80, 102p NERACEDBNT0452
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations presented in this bibliography cover computerized tomography, computerized three-dimensional treatment planning system utilizing interactive colour graphics and nuclear medicine imaging. Computer tomography of the pancreas, image reconstruction in nuclear medicine, air-gap correction in electron treatment planning and technique aid equipment for whole-body CT scanning are also included in this bibliography. (Contains 085 citations.)

PB80-853310 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Angiography. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Aug 80, 54p NERACEI NT0495
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations presented in this bibliography cover the method of functional imaging applied to x-ray angiograms, computerized angiography, exercise testing, cardiovascular imaging and image processing, quantitative analysis of coronary artery diseases, and myocardial blood flow. Computer models for assessing angiograms are also included in this bibliography. (Contains 039 citations.)

PB80-853336 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pneumoconiosis. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Thomas H. Jones. Aug 80, 50p NERACEDBNT0421
Sponsored in part by National Technical Information Service, Springfield, VA.

These abstracts deal with worldwide research reports on the general topic of pneumoconiosis. The emphasis is on 'coal miners pneumoconiosis' (anthracosis) and silicosis, however, there are many references to other types, such as 'byssinosis', 'asbestosis' and 'aluminosis'. The reports cover the detection/diagnosis, pathology, epidemiology and preventative aspects, as well as the social, legal and economic implications of this condition. (Contains 027 citations.)

PB80-853468 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Anesthesiology. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Thomas H. Jones. Jun 80, 71p NERACEDBNT0494
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover the control of occupational exposure to inhalational anesthetics, the use of Cl 744 as an anesthetic for laboratory animals, application of electrical current in dental anesthesia, public health aspects of critical care medicine and anesthesiology, and methods for eliminating waste anesthetic gases and vapors. Anesthesia for outpatient surgery is also included in this bibliography. (Contains 039 citations.)

PB80-853476 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Anesthesiology. June, 1970-May, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-May 80,
Thomas H. Jones. Jun 80, 53p NERACEI NT0494
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover computer controlled anesthesia, pharmacokinetic model of closed-circuit inhalation anesthesia, system for automatic feedback controlled administration of drugs, quantitative online measurement of anesthetic gas exchange, and apparatus for inhalation anesthesia. Current techniques and future requirements for monitoring anesthesia in the operating room are also included in this bibliography. (Contains 041 citations.)

PB80-855042 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Burn Therapy. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Thomas H. Jones. Jun 80, 49p NERACEDBNT0548
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations covered in this bibliography cover wound healing in below and above knee amputation, treatment after radiation injury and plutonium contaminated wounds, DTPA treatment methods, treatment plan for acute radiation-induced skin injuries, and clinical experience with ulcerative skin diseases. The effects of whole-body and partial-body X irradiation during wound healing are also included in this bibliography. (Contains 032 citations.)

PB80-855505 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computer Aided Diagnosis. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 72p NERACEI NT0542
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations presented in this bibliography cover role of modeling in medical diagnosis, diagnosis by computer, online realtime computerized diagnosis, and computer-aided three-dimensional display systems for ultrasonic diagnosis of a breast tumor. Channel for visual diagnostic control and analysis in a system for automation of experiments, and consulting and diagnosis using microcomputers are also included. (Contains 060 citations.)

PB80-856313 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Health Services. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 153p NERACUSGNT1038
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the applications of operations research and systems analysis to health care services and medical service delivery systems are contained in this retrospective bibliography. (Contains 134 citations.)

PB80-859432 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Dental Adhesives. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 66p NERACUSGNT0498
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover the strength/durability, bonding/adhesion, and storage stability of various adhesives and resins used in dental restoration. Also included are citations dealing with the adhesive properties and the comparison of various adhesives, such as cyanoacrylates and acrylics, which are applicable to dentistry. (Contains 053 citations.)

PB80-859440 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Dental Alloys. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 43p NERACUSGNT0497
Sponsored in part by National Technical Information Service, Springfield, VA.

These reports deal with the topic of dental alloys and amalgams. Included are the areas of metallography, amalgamation and general properties, production, and corrosion resistance of dental casting alloys. These alloys are primarily gold, silver, or nickel based, however, there are many other types reported. (Contains 034 citations.)

PB80-859986 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electromyography. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 127p NERACUSGNT0499
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers literature on that aspect of biomedical engineering pertaining to electromyography. The reports cover electromygraphic data on locomotion, prosthetic movements, pacemakers, biofeedback, and other myoelectric signals from contracting muscle. Some abstracts cover interference from humidity or perspiration on myoelectric-operated devices. Abstracts also include design and application of electrodes, display devices, and processors used in myoelectric studies, and report on the interpretation, characterization and pattern recognition of the EMG signals. (Contains 108 citations.)

PB80-860018 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Angiography. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Thomas H. Jones. Jul 80, 174p NERACIAANT0495
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover nuclear cardiology, the effects of exercise training, computer quantification of coronary angiograms, use of vector cardiography, quantitative radionuclide angiography, cardiobascular imaging, and computer analysis of electrocardiogramsand vector cardiograms. Angioarchitectonics, echocardiographs, and coronary artery diseases are also included in this bibliography. (Contains 135 citations.)

PB80-860042 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computer Aided Diagnosis. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,

Thomas H. Jones. Jun 80, 70p
NERACUSGNT0542
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations presented in the bibliography cover computer aid medical diagnosis, knowledge engineering for medical decision making, and an investigation of computer coaching for informal learning activities. Adaptive instructional models, optimal electrocardiography, aspects of a theory for automated student modelling and technical description of control systems are also included in this bibliography. (Contains 054 citations.)

PB80-929413 PC$5.25/MF$3.00
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Etiology, Epidemiology, and Biology of Melanomas and Other Skin Cancers.
Special listing.
9 Sep 80, 54p NCI/ICRDB/SL-402
Supersedes NTISUB/E/294-020.

This Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Etiological factors in melanoma and skin carcinogenesis, and related epidemiology; Biology and biochemistry of melanomas; Biology and biochemistry of skin and skin cancers.

PB80-929414 PC$4.50/MF$3.00
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Preclinical and Clinical Studies on Diagnosis, Prognosis, Therapy, and Immunology of Melanomas and Other Skin Cancers.
Special listing.
15 Sep 80, 48p NCI/ICRDB/SL-448
Supersedes NTISUB/E/294-009.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Preclinical studies on diagnosis and treatment of melanomas and other skin cancers; Immunology of human melanomas and other skin cancers; Clinical diagnosis and prognosis of melanomas and other skin cancers; Clinical therapy of melanomas and other skin cancer.

PB80-929907 PC$5.25/MF$3.00
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Myeloma Proteins, Other Paraproteins, Myelomas, and Other Monoclonal Gammopathies.
Special listing.
8 Sep 80, 34p NCI/ICRDB/SL-405
Supersedes NTISUB/E/299-009.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Myeloma proteins and other paraproteins--Synthesis, structure, and other properties; Myeloma-related immunology; Etiology and pathogenesis of myelomas and other paraproteinemias; Therapy and other studies of multiple myeloma; Studies of cultured myeloma cells and other studies of myelomas; Clinical studies of myelomas and other gammapathies.

PB80-929908 PC$4.50/MF$3.00
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Differentiation and Maturation of Normal and Neoplastic Hematopoietic Cells.
Special listing.
12 Sep 80, 48p NCI/ICRDB/SL-408
Supersedes NTISUB/E/299-010.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Differentiation of stem cells and progenitor cells; Lymphoid cell differentiation and maturation; Erythroid cell differentiation and maturation; Cell proliferation and differentiation in leukemia and preleukemia; Broad programs of hematopoietic cell proliferation and differentiation.

UCLA-12-1239 PC **A02**/MF **A01**
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
Noninvasive Measurement of Regional Myocardial Glucose Metabolism by Positron Emission Computed Tomography.
H. R. Schelbert, and M. E. Phelps. 14p
Contract EY-76-C-03-0012

While the results of regional myocardial glucose metabolism measurements using positron emission computed tomography (exp 13 N-ammonia) are promising, their utility and value remains to be determined in man. If this technique can be applied to patients with acute myocardial ischemia or infarction it may permit delineation of regional myocardial segments with altered, yet still active metabolism. Further, it may become possible to evaluate the effects of interventions designed to salvage reversibly injured myocardium by this technique. (ERA citation 05:029689)

6F. Environmental Biology

AD-A087 967/6 PC **A02**/MF **A01**
Naval Medical Research Unit No 2 APO San Francisco 96528
The Occurrence of Leptotrombidium (Leptotrombidium) arenicola in Indonesia.
Technicl rept.,
Tuti R. Hadi, E. E. Stafford, and Ratna Irsiana.
1979, 10p Rept no. NAMRU-2-TR-835
Pub. in BIOTROP Special Publication, n6 p61-66 1979. Proceedings of the BIOTROP Symposium on Ectoparasite Biology.

No abstract available.

AD-A088 271/2 PC **A10**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Ecological Baseline, Fort Hood, Texas.
Final rept.,
W. D. Severinghaus, R. S. Baran, and R. E. Riggins. Aug 80, 209p Rept no. CERL-TR-N-95

This report presents ecological baseline information on the biota of Fort Hood, TX. Surveys were conducted in fall 1978 and spring 1979 on the terrestrial and aquatic flora and fauna for the purpose of helping Fort Hood personnel more accurately determine the environmental impacts of their military training and related activities. Representative terrestrial communities were surveyed for vertebrates (mammals, birds, reptiles, and amphibians) and vegetation. Representative aquatic communities were sampled for periphyton, phytoplankton, zooplankton, macrophytes, macroinvertebrates, and fish. Data gathered are in the form of species lists, species composition, density, and/or relative abundance. (Author)

BNL-51195 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Proceedings of the International Workshop on the Effects of Acid Precipitation on Vegetation, Soils, and Terrestrial Ecosystems, Brookhaven National Laboratory, June 12 to 14, 1979.
L. S. Evans, and G. R. Hendrey. 1979, 57p
Contract AC02-76CH00016

The objectives of the workshop were to determine the levels of current knowledge of the effects of acid precipitation on vegetation, soils, and terrestrial ecosystems; research needed in these areas to understand the environmental impacts of acid rain; and to help coordinate research groups to avoid excessive duplication of research. The workshop was designed so that researchers in the areas of effects of acid precipitation on vegetation, soils, and whole ecosystem approaches could communicate effectively. There was a general consensus that acid rain at extreme ambient levels, or in artificial systems that simulate extreme ambient levels, causes injury to plant tissues. A major area of concern of acid rain injury was thought to be plant reproduction. The overall levels of significance of plant injury among various plant species remain unknown. The most important priorities in the area of effects of acid rain on crops were an evaluation of effects on crop yields and interaction of acid rain in combination with pollutants on various plants. Few participants thought that ambient acid rain loadings have altered soils to such a degree that plants are affected at present, but many thought that acid rain could cause some alterations in soils. The most important research priorities were in the areas of the effects of acid rain on increased leaching of exchangeable plant nutrients and alterations in phosphorous availability. All participants agreed that there are alterations in terrestrial ecosystems from acid precipitation. However, no demonstrated harmful effects were presented from natural ecosystems. Further research on the effects of acid rain on terrestrial ecosystems should be directed mostly toward the interaction of acid rain with toxic elements such as Al, Fe, and Mn and on the effects on nutrient cycling, especially that of nitrogen. (ERA citation 05:031229)

DOE/CH/93010-1 PC **A05**/MF **A01**
National Research Council, Washington, DC. Div. of Medical Sciences.
Health Effects of Fossil-Fuel Combustion Products: Needed Research.
1980, 78p
Contract AT02-76CH93010

An examination is made of the research needed to expand and clarify the understanding of the products of fossil-fuel combustion, chiefly that taking place in stationary sources of power. One of the specific objectives that guided the study on which this report is based was to identify the pollutants potentially hazardous to man that are released into the environment in the course of the combustion of fossil fuels. The hazards of principal concern are those which could cause deleterious, long-term somatic and genetic effects. Another objective was to specify the nature of the research needed to determine the health effects of these pollutants on the general population. Special attention was paid to the interaction of pollutants; the meteorologic and climatic factors that affect the transport, diffusion, and transformation of pollutants; the effects of concentrations of aerosol, particulate, and thermal loads on biologic systems; and the susceptibility of some portions of the population to the effects of pollutants on the skin and cardiovascular, pulmonary, and urinary systems. Other objectives were to evaluate the methods of the proposed research, including analytic and interpretation techniques, to identify fields in which the available scientific information is inadequate for regulatory decision-making and to recommend a research program to meet those deficiencies, and to provide a logical framework within which the necessary information can be developed (the proposed program is presented in terms of subject, methods, and priorities). (ERA citation 05:031239)

KFKI-1979-21 PC **A03**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Determination of Phosphorus and Potassium in Sugar Cane Leaves by 14 MeV Neutrons.
R. A. Diaz, A. Z. Nagy, L. Bakos, and J. C. Soria.
Apr 79, 30p
In Spanish.
U.S. Sales Only.

The possibilities of N, P, K evaluation in samples of sugar cane leaves were discussed. A method for determining P and K content in this samples by 14 MeV neutron activation analysis is described. Corrections for K and Si were taken into account. The limit of detection for P was 0.1 mg and for K it was 4 mg. The precision for P and K was 10% in agreement with the values given by other authors. (Atomindex citation 11:507636)

LA-8050-NERP(V.1) PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.

Status of the Flora of the Los Alamos National Environmental Research Park.
T. S. Foxx, and G. D. Tierney. May 80, 58p
Contract W-7405-ENG-36

Under the Endangered Species Act of 1973, it became necessary to locate critical habitats of plant species in danger of extinction on State and Federal lands. In 1976 the Los Alamos National Environmental Research park (LA/NERP) was established to provide a study area that would contribute to the understanding of how man can best live in balance with nature while enjoying the benefits of technology. Under this mandate, a study to provide information regarding the locations of possible endangered, threatened, protected, and rare species within the LA/NERP was initiated in August 1977. (ERA citation 05:031141)

LMF-67 PC **A02**/MF **A01**
Lovelace Foundation for Medical Education and Research, Albuquerque, NM. Inhalation Toxicology Research Inst.
Evaluation of a Recently Designed Multi-Tiered Exposure Chamber.
R. L. Beethe, R. K. Wolff, L. C. Griffis, C. H. Hobbs, and R. O. McClellan. Nov 79, 17p
Contract AC04-76EV01013

We have evaluated a newly designed multi-tiered chamber intended for inhalation studies. Our particular concerns were the aerosol concentration distribution within the chamber and the resultant lung deposition in exposed animals. Our findings may be summarized as follows: aerosol concentrations were found to vary only 5-9% for different locations within the chamber for a variety of conditions tested; aerosol size distributions were constant throughout the chamber; lung deposition in rats was also found to be quite uniform for rats at different locations throughout the chamber; light levels and ammonia levels were acceptable; and animal handling characteristics were excellent. We have found this to be an excellent chamber which combines the economic advantages of reduced animal care and floor space requirements with good aerosol distribution characteristics. Because of the slight side-to-side variation in concentration it would be advisable, as a precaution, to rotate animals from tier to tier throughout a chronic exposure so that animals spend equal times on each tier. (ERA citation 05:031232)

PB80-223761 PC **A04**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Guideline on Procedures for Constructing Air Pollution Isopleth Profiles and Population Exposure Analysis.
Guideline series rept.
Oct 77, 74p OAQPS-1.2-083, EPA-450/2-77-024A
See also PB80-223779.

This guideline document provides an overview of methodologies that exist for constructing pollutant isopleth displays and for estimating population exposure to air pollutants from air monitoring data. Actual examples of the methodologies are presented for applications to data for the New York-New Jersey-Connecticut area and for the Los Angeles area. This report is to assist the EPA's Regional Offices and States in reviewing their data bases to determine feasibility of performing isopleth/population exposure analyses, and to guide regional, state, and local air pollution control agencies in actually conducting such analyses. A population exposure analysis, which combines air quality data and demographic data to estimate population exposure to air pollution, is outlined. A companion 'Users Manual' describes existing computer software applicable to these tasks.

PB80-223779 PC **A06**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Users Manual for Preparation of Air Pollution Isopleth Profiles and Population Exposure Analysis.
Guideline series rept.,
Neil H. Frank, and Margaret Swann. Oct 77, 122p OAQPS-1.2-083A, EPA-450/2-77-024B
See also PB80-223761.

This report is a companion document to the Guideline on Procedures for Constructing Air Pollution Isopleth Profiles and Population Exposure Analysis (OAQPS No. 1.2-083). It contains an overview of the analysis procedures and documentation for computer software. Three programs (SYMAP, Tricon and Hybrid) can be used to produce computer-drawn maps for isopleth analysis. Two programs (LPEM and SPEM) are used for spatial interpolation and population exposure analysis.

6H. Food

PB80-226822
(Order as PB80-226749, PC **A15**/MF **A01**)
National Marine Fisheries Service, Kodiak, AK. Northwest and Alaska Fisheries Center.
Black Rockfish, 'Sebastes melanops': Changes in Physical, Chemical, and Sensory Properties When Held in Ice and in Carbon Dioxide Modified Refrigerated Seawater,
Jeff Collins, Kermit D. Reppond, and Fern A. Bullard. Apr 79, 5p NOAA-80080501-8
Included in Fishery Bulletin, v77 n4 p865-870 1980.

The purpose of this study was to determine changes in various properties of fillets, minced flesh, and washed minced flesh from black rockfish, Sebastes melanops, as affected by time of holding in ice or carbon dioxide modified refrigerated seawater and frozen storage at -18C. Fish were held up to 14 days in the holding mediums and removed periodically and analyzed for changes in physical, chemical, and sensory properties. The yield of fillets calculated from the initial whole weight was unaffected by time of holding in either system.

PB80-850001 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ethylene Oxide Sterilization in the Food Industry. January, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Mar 80,
Edward Ketchledge. Jun 80, 43p
NERACFSTNF0222
Sponsored in part by National Technical Information Service, Springfield, VA.

This review covers the use of ethylene oxide as a fumigant in the food and packaging industries. The analysis and toxicology of residual ethylene oxide and reaction products is throughly cited. The authors also discuss the mechanism of bactericidal action, shelf-life, and organoleptic properties of treated food. (Contains 034 citations.)

PB80-850019 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Decolorization in the Food Industry . January, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Mar 80,
Edward Ketchledge. Jun 80, 181p
NERACFSTNF0224
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains references which review the various methods used to decolorize food products. Equipment and processes mentioned include: activated carbon; ion-exchange resins; membrane filters; and chemical oxidation. Some of the food products considered include: raw sugar; wine; sake; and vegetable oils. (Contains 200 citations.)

PB80-850027 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Deodorization in the Food Industry. January, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Mar 80,
Edward Ketchledge. Jun 80, 153p
NERACFSTNF0223
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains references which review the various methods used to deodorize food products. Information elucidating specific apparatus and processes are addressed. Specific food products mentioned include: cocoa butter; edible fats and oils; fish; milk; and animal by-products. (Contains 163 citations.)

PB80-850035 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Sunflower Oil. July, 1976-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jul 76-Mar 80,
Edward Ketchledge. Jun 80, 194p
NERACFSTNF0221
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography reviews the preparation and use of sunflower oil. References citing chemical composition, production, marketing, refining, hycrogenation and oxidation stability are mentioned. The physiochemical and toxicological properties of the heated oil are also addressed. (Contains 200 citations.)

PB80-850043 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Intermediate Moisture in Foods. January, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Mar 80,
Edward Ketchledge. Jun 80, 70p
NERACFSTNF0220
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains information dealing with intermediate moisture foods. References citing water activity determination, storage stability (lipoxidation, browing), humectants, microbiological stability, formulation, and manufacture are reviewed. Information on the texture, organoleptic properties, and marketing of intermediate moisture foods is also addressed. (Contains 071 citations.)

PB80-850050 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Licorice in Foods. January, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Mar 80,
Edward Ketchledge. Jun 80, 50p
NERACFSTNF0219
Sponsored in part by National Technical Information Service, Springfield, VA.

This review covers the preparation and use of licorice extracts in the food industry. References citing the chemical composition, health hazards, and deglycyrrhizination of the flavor extract are mentioned. The use of the flavorant in sugar confectioneries is also addressed. (Contains 071 citations.)

PB80-850068 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pectolytic Enzymes in Foods. February, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Feb 72-Mar 80,
Edward Ketchledge. Jun 80, 67p
NERACFSTNF0218
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography reviews reports on the use of pectolytic enzymes in the food industry. References citing characteristics, biochemistry, physiochemistry, depectinization, taste improvement, and beverage treatment are reviewed. (Contains 061 citations.)

PB80-850076 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.

Diethylstilbestrol in Foods. January, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Mar 80,
Edward Ketchledge. Jun 80, 73p
NERACFSTNF0217
Sponsored in part by National Technical Information Service, Springfield, VA.

This report covers the uses and analysis of the growth promoting hormone diethylstilbestrol to increase meat production (carcass quality) is thoroughly addressed. References citing meat residue analysis, toxicity, carcinogenicity, and legislation of DES are also covered. (Contains 065 citations.)

PB80-850084 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ginseng. January, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Mar 80,
Edward Ketchledge. Jun 80, 28p
NERACFSTNF0216
Sponsored in part by National Technical Information Service, Springfield, VA.

This review covers the preparation of Ginseng extracts for the food industry. References citing the chemical composition, toxicity testing, metabolic effects, and root storage of Ginseng are also mentioned. Consideration is also given to various Ginseng food products. (Contains 020 citations.)

PB80-850092 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Diabetic Food. January, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Mar 80,
Edward Ketchledge. Jun 80, 56p
NERACFSTNF0215
Sponsored in part by National Technical Information Service, Springfield, VA.

This review covers the formulation of low-sugar, low-fat, high-protein food sources for the production of diabetic foods. References citing organoleptic evaluation, artificial/non-nutritive sweeteners, chemical composition, and legislation of diabetic foods are mentioned. Production of diabetic foods for the dairy, bakery, and brewing industries is specifically addressed. (Contains 057 citations.)

PB80-850100 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Bentonite Utilization in the Food Industry. January, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Mar 80,
Edward Ketchledge. Jun 80, 125p
NERACFSTNF0214
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography reviews the use of bentonite in the food industry. References citing deproteination, production, adsorption, clarification, physiochemistry, filtration, and legislation are reviewed. Food products mentioned include wine, beer, cheese whey, fruit juices, and vegetable oil. (Contains 127 citations.)

PB80-850118 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Lecithin in Food. October, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Oct 72-Mar 80,
Edward Ketchledge. Jun 80, 202p
NERACFSTNF0213
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains reports dealing with phospholipids and lecithin in various food products. References citing analytical methods, antioxidative properties, production, emulsifying agents, storage stability, health effects, and legislation are reviewed. (Contains 200 citations.)

PB80-850126 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Phospholipids in Foods. January, 1975-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 75-Mar 80,
Edward Ketchledge. Jun 80, 193p
NERACFSTNF0212
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains reports dealing with the presence of phospholipids in various food products. References citing analytical methods, antioxidative properties, production, emulsifying agents, storage stability, health effects, and legislation are reviewed. (Contains 200 citations.)

PB80-850134 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Polychlorinated Biphenyls in Foods. April, 1975-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Apr 75-Mar 80,
Edward Ketchledge. Jun 80, 197p
NERACFSTNF0211
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains information on the presence of polychlorinated biphenyls (PCB's) in various food products. References citing analytical methods, toxicology, and legislation are reviewed. Food products considered include: meat, fish, fruit, dairy, vegetable oil, and packaging materials. (Contains 200 citations.)

PB80-850142 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pectins in Food. June, 1975-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jun 75-Mar 80,
Edward Ketchledge. Jun 80, 191p
NERACFSTNF0210
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains reports dealing with pectins in various food products. References citing occurrence, analytical methods, manufacture, storage stability, clarification, gellation, nutritional vlue, and legislation are reviewed. (Contains 200 citations.)

PB80-850175 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cysteine in Foods. January, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Mar 80,
Edward Ketchledge. Jun 80, 156p
NERACFSTNF0207
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains reports on the sulfur containing amino-acid, cysteine in various food products. References citing chemical analysis, nutritional value, food fortification, bioavailability, flavor enhancement, toxicology, and legislation are reviewed. The use of cysteine as a bakery additive (emulsifier) and browning inhibitor (antioxidant) is also addressed. (Contains 134 citations.)

PB80-850183 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Methionine in Foods. December, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Dec 72-Mar 80,
Edward Ketchledge. Jun 80, 211p
NERACFSTNF0206
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains reports on the sulfur containing amino-acid, methionine in various food products. References citing chemical analysis, nutritional value, food fortification, bioavailability, flavor enhancement, toxicology, and legislation are reviewed. (Contains 200 citations.)

PB80-850191 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tryptophan in Foods. January, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Mar 80,
Edward Ketchledge. Jun 80, 216p
NERACFSTNF0205
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains reports on the essential amino-acid, tryptophan in various food products. References citing chemical analysis, nutritional value, food fortification, bioavailability, flavor enhancement, toxicology, and legislation are reviewed. (Contains 191 citations.)

PB80-850209 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Peppermint. January, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Mar 80,
Edward Ketchledge. Jun 80, 53p
NERACFSTNF0204
Sponsored in part by National Technical Information Service, Springfield, VA.

This review covers the uses and preparation of pepperment oil for the food industry. References citing the chemical composition, pesticide residue analysis, plant cultivation, and plant processing of peppermint are mentioned. The use of peppermint oil as a flavorant is also addressed. (Contains 051 citations.)

PB80-850217 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vegetable Oil. October, 1977-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Oct 77-Mar 80,
Edward Ketchledge. Jun 80, 188p
NERACFSTNF0203
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography reviews the preparation and use of various vegetable oils. References citing chemical composition, production, marketing, refining, hydrogenation, and oxidation stability are mentioned. Properties of heated oil are also addressed. (Contains 200 citations.)

PB80-850225 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cotton Seed Oil. January, 1973-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 73-Mar 80,
Edward Ketchledge. Jun 80, 188p
NERACFSTNF0202
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography reviews the preparation and use of cottonseed oil. References citing chemical composition, production, marketing, refining, hydrogenation, and oxidation stability are mentioned. The physiochemical and toxicological properties of the heated oil are also addressed. (Contains 261 citations.)

PB80-850233 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plastic Bottles Used in the Food Industry. July, 1972-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jul 72-Mar 80,
Edward Ketchledge. Jun 80, 141p
NERACFSTNF0201
Sponsored in part by National Technical Information Service, Springfield, VA.

This review covers articles dealing with the production and use of plastic bottles for the food in-

dustry. References citing molding techniques, safety, labelling, marketing, and legislation are mentioned. The analysis and toxicology of migrated monomers and stabilizers is also addressed. (Contains 200 citations.)

PB80-850241 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Disinfectants Used in the Food Industry. March, 1973-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Mar 73-Mar 80,
Edward Ketchledge. Jun 80, 183p
NERACFSTNF0200
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography reviews the various chemical disinfectants used in the food industry. References citing residue analysis, bactericidal activity, equipment, toxicology, and legislation are addressed. (Contains 200 citations.)

PB80-850258 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Food Rheology. March, 1978-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Mar 78-Mar 80,
Edward Ketchledge. Jun 80, 194p
NERACFSTNF0199
Sponsored in part by National Technical Information Service, Springfield, VA.

This review covers articles dealing wth the rheological properties of various food products. References relating food rheology to texture, handling, and organoleptic properties are mentioned. The methods used to measure food rheology, as well as, the use of additives to enhance a food's rheological properties are also addressed. (Contains 200 citations.)

PB80-850266 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Amino Acids in Foods. May, 1979-March, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for May 79-Mar 80,
Edward Ketchledge. Jun 80, 206p
NERACFSTNF0198
Sponsored in part by National Technical Information Service, Springfield, VA.

This review contains articles which consider the amino-acid composition of various food products. References citing chemical analysis of free and protein-bound amino acids, organoleptic evaluation, toxicology, storage stability, and food maturation are mentioned. The preparation and purification of specific amino-acids is also addressed. (Contains 200 citations.)

PB80-853641 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Lecithins. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 46p
NERACUSGNT0514
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which deal with lecithins and their role in biological systems. Included are biochemical reactions, evaluation of lecithin as a food ingredient and the properties of lecithin. (Contains 034 citations.)

PB80-853658 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Lecithins. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 67p
NERACEDBNT0514
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports which deal with lecithins, including properties and reactions. Biological effects of such materials as nitrogen dioxide and ozone as well as of radiation, are also discussed. (Contains 047 citations.)

PB80-855109 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cold Storage. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 49p NERACUSGNT0731
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the applications of cold storage for cooling of commercial buildings, residential dwellings as well as foods. The different techniques using solar energy, rock beds and nocturnal radiation for cold storage energy are also discussed. (Contains 032 citations.)

PB80-855117 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cold Storage. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jul 80, 66p NERACEDBNT0731
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the applications of cold storage for cooling of commercial buildings, residential dwellings as well as foods. The different techniques using solar energy, rock beds and nocturnal radiation for cold storage energy are also discussed. (Contains 049 citations.)

PB80-855182 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
High Performance Chromatographic Analysis of Foods. January, 1972-May, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-May 80,
Lawrence H. Marcus. Jul 80, 287p
NERACFSTNT0398
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with the application of high performance (or high pressure) liquid chromatography to the analysis of foodstuffs, including vitamins, oils, food dyes, milk, preservatives, flavors, trace elements and contaminants. (Contains 094 citations.)

PB80-855190 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Microencapsulation of Food. January, 1972-June, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Jun 80,
Lawrence H. Marcus. Jul 80, 28p
NERACFSTNT0393
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which discuss methods and applications of encapsulation and microencapsulated substances, such as flavorings, aroma compounds and preservatives, to foods, such as dairy products, sausages, fruits, chewing gum, condiments and even cattle feeds. (Contains 093 citations.)

6J. Industrial (Occupational) Medicine

AD-A088 469/2 PC **A02**/MF **A01**
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Occupational Health Evaluation for Inorganic Mercury at CFB Borden - Building A-171.
Technical communication rept.,
B. J. Gill, and J. L. O'Neill. Jun 80, 13p Rept no. DCIEM-80-C-30

An occupational health evaluation of the Aircraft Instrument Laboratory, Rooms 117A and B of Building A171, CFB Borden was carried out to determine if a potential toxic hazard existed because of numerous small spills of inorganic mercury over a period of years. Atmospheric inorganic mercury vapour levels were measured, and personal monitoring, by passive dosimetry was carried out; mercury levels were found to be below or at the recommended TLV of 0.05 mg/m3. Recommendations are given regarding safe operating procedures to be followed in the use of inorganic mercury.

PB80-147960 MF **A01**
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-California, 1978.
Final rept.
1980, 1449p BLS/SDS/CA-78
Includes seven sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 54 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of injured or ill worker. Data were compiled by the California Department of Industrial Relations from records of workers' compensation cases involving one or more lost workdays, which were reported during 1978, and all cases determined to be work-related fatalities in 1978. Data include cases arising in private and public employments with the following principal exceptions: some domestic servants, casual employees, and part-time gardeners, newspaper vendors, volunteers for nonprofit and charitable organizations, employees of charitable organizations, and uncompensated athletes. In addition, Federal and railroad employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-169055 MF **A01**
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-Alaska, 1978.
Final rept.
1980, 919p BLS/SDS/AK-78
Includes five sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 56 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of injured or ill worker. Data were compiled by the Alaska Department of Labor from records of workers' compensation cases which occurred during 1978 and involved fatalities or medical treatment beyond ordinary first aid. Data include cases arising in private and public employments with these principal exceptions: some part-time or transient help, and executive officers of certain nonprofit corporations for whom coverage is voluntary. In addition, Federal, railroad, and some maritime employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-183536 MF **A01**
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-Tennessee, 1979.
Final rept.
1980, 1255p BLS/SDS/TN-79
Includes seven sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 52 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of the injured or ill worker. Data were compiled by the Tennessee Department of Labor from records of workers' compensation cases resulting in death, permanent-partial disability, or eight or more lost workdays which were received during 1979. The data include cases arising in public and private employments with these principal exceptions: agricultural employees, household workers, casual employees, and employments with fewer than five workers, for which voluntary coverage is permitted. In addition, Federal and railroad employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-183544 MF A01
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-Hawaii, 1979.
Final rept.
1980, 1594p BLS/SDS/HI-79
Includes six sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 56 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of the injured or ill worker. Data were compiled by the Hawaii Department of Labor and Industrial Relations from reports of workers' compensation cases which were received during 1979 and which resulted in absence for one day or more or which required medical services other than first aid. Data include cases arising in public employments; and in private employments with these principal exceptions: certain household and casual workers, and students working for colleges in return for room, board, and tuition. In addition, Federal and railroad employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-183551 MF A01
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-North Carolina, 1979.
Final rept.
1980, 1588p BLS/SDS/NC-79
Includes eight sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 64 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age, and indemnity compensation and medical cost of the injury or illness. Data were compiled by the North Carolina Department of Labor from records of workers' compensation cases closed during 1979 for which indemnity compensation and/or medical benefits were paid. Indemnity compensation was paid for cases in which disability exceeded seven days. Employers were allowed to report certain minor cases in a summary report; such cases are not included in these data. Data include cases arising in public employments, and in private employments with these principal exceptions: some workers in establishments of fewer than four employees, sole proprietors and partners, household workers, certain sawmill and logging workers, senior members of the civil air patrol, and farm labor, for which employments voluntary coverage is permitted. In addition, Federal, railroad and maritime employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-186000 MF A01
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-Delaware, 1979.
Final rept.
1980, 827p BLS/SDS/DE-79
Includes four sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 64 tabulations of characteristics of occupatinal injuries and illnesses related to industry, occupation, and age of the injured or ill worker. Data were compiled by the Delaware Department of Labor from records of workers' compensation cases involving four or more lost workdays closed during 1979. Data include cases arising in public and private employments with these principal exceptions: farmworkers and certain household and casual workers. In addition, Federal and railroad employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-187776 MF A01
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-Iowa, 1979.
Final rept.
1980, 1166p BLS/SDS/IA-79
Includes six sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 28 tabulations of characteristics of occupational injuries or illnesses related to industry, occupation, and age of the injured or ill worker. The data were compiled by the Iowa Bureau of Labor from records of workers' compensation cases which occurred during 1979 and involved fatalities or two or more lost workdays. The data include cases arising in private and public employments with these principal exceptions: some farmworkers, domestic, and casual workers, and various officials of non-profit organizations. In addition, Federal employees and employees engaged in railroad and maritime employments are not covered by the State act and cases involving such employees will not be included in these data.

PB80-187784 MF A01
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-Nebraska, 1979.
Final rept.
1980, 1498p BLS/SDS/NE-79
Includes eight sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 54 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of the injured or ill workers. Data were compiled by the Nebraska Workmen's Compensation Court from records of workers' compensation cases which involved fatalities, and illnesses, and injuries involving lost worktime, medical treatment, or first aid, which occurred during 1979. Data include cases arising in public employments, and in private employments with these principal exceptions: household workers, and farm and ranch labor, for which voluntary coverage is premitted. In addition, Federal and railroad employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-197668 MF A01
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-Washington, 1979.
Final rept.
1980, 1601p BLS/SDS/WA-79
Includes eight sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 52 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of injured or ill worker. Data were compiled by the Washington Department of Labor and Industries from records of workers' compensation cases which were received in 1979 whose dates of occurrence were not prior to January 1977. Data include cases arising in private and public employments with the principal exceptions of certain agricultural and household workers, volunteers for charitable organizations, jockeys in horseraces, sole proprietors, partners, and corporate officers for whom coverage is voluntary. In addition, Federal and railroad employments are not covered by State workers' compensation acts and cases involving such employees are not included in the data.

PB80-197676 MF A01
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-Massachusetts, 1979.
Final rept.
1980, 775p BLS/SDS/MA-79
Includes four sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 50 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of the injured or ill worker. Data were compiled by the Massachusetts Industrial Accident Board from records of reported workers' compensation cases involving one or more lost workdays, which are received during 1979. Data include only cases arising in private sector manufacturing.

PB80-197684 MF A01
Bureau of Labor Statistics, Washington, Dc.
Occupational Injuries and Illnesses-Maryland, 1979.
Final rept.
1980, 1363p BLS/SDS/MD-79
Includes seven sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 56 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of the injured or ill worker. Data were compiled by the Maryland Department of Licensing and Regulation from records of reported workers' compensation cases involving one or more lost workdays, which occurred during 1979. Data include cases arising in private and public employments with these principal exceptions: some farm, household, and casual workers. In addition, Federal, railroad, and maritime employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-197817 MF A01
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-Wyoming, 1979.
Final rept.
1980, 895p BLS/SDS/WY-79
Includes five sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 54 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of the injured or ill worker. Data were compiled by the Wyoming Department of Labor and Statistics from records of workers' compensation cases occurring during 1979 which involved fatalities, illnesses, and injuries involving loss of consciousness, restriction of work or motion, transfer to another job or termination, or medical treatment other than first aid. Data include cases arising in extra-hazardous occupations with these principal exceptions: casual and household workers, ranch, farm, agricultural, and horticultural labor, and employees engaged in stock raising. In addition, Federal and railroad employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-202245 MF A01
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-New Mexico, 1979.
Final rept.
1980, 822p BLS/SDS/NM-79
Includes four sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 56 tabulations of occupational injuries and illnesses related to industry, occupation, and age of the injured or ill worker. The data were compiled by the New Mexico Health and Environment Department from records of workers' compensation cases involving eight or more days of disability which were received during 1979. The data include cases arising in private and public employments with these principal exceptions: private employers with two or fewer employees, farm labor, and household workers, for which coverage is voluntary, casual workers, and students employed by educational institutions to help defray the costs of tuition. Federal and railroad workers are not covered by the State act and cases involving such employments are not included in these data.

PB80-203664 MF A01
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-Arizona, 1979.
Final rept.
1980, 1225p BLS/SDS/AZ-79
Includes six sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 50 tabulations of occupational injuries and illnesses related to industry, occupation, and age of the injured or ill worker. The data were compiled by the Arizona Industrial Commission from records of workers' compensation cases involving seven or more lost workdays or disability which were received during 1979. The data include cases arising in private and public employments with these principal exceptions: household workers, for which coverage is voluntary, and casual workers. Federal and railroad workers are not covered by the State act and cases involving such employments are not included in these data.

PB80-211659 MF A01
Bureau of Labor Statistics, Washington, DC.

Occupational Injuries and Illnesses-Maine, 1979.
Final rept.
1980, 1518p BLS/SDS/ME-79
Includes seven sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 54 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of the injured or ill worker. Data were compiled by the Maine Department of Manpower Affairs, Bureau of Labor, from reports of workers' compensation cases involving one or more lost workdays, requiring the services of a physician, or resulting in damages to prosthetic devices, which occurred during 1979 and were reported. Data include cases arising in public employments, and in private employments with the exception of seasonal or casual farm laborers, certain other agricultural employees, and household workers. In addition, Federal and railroad employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-214711 MF **A01**
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-California, 1979.
Final rept.
1980, 1510p BLS/SDS/CA-79
Includes eight sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 50 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of injured or ill worker. Data were compiled by the California Department of Industrial Relations from records of workers' compensation cases involving one or more lost workdays, which were reported during 1979, and all cases determined to be work-related fatalities in 1979. Data include cases arising in private and public employments with these principal exceptions: some household workers, casual employees, and part-time gardeners, newspaper vendors, volunteers for nonprofit and charitable organizations, employees of charitable organizations, uncompensated athletes, working members of partnerships, and certain maritime employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-217227 MF **A01**
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-Idaho, 1978.
Final rept.
1980, 1300p BLS/SDS/ID-78
Includes seven sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 74 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of the injured or ill worker, and indemnity compensation and medical cost of the injury or illness. Data were compiled by the Idaho Industrial Commission from records of workers' compensation cases. Tables are either based on cases which occurred during 1978, or compensation cases closed during 1978 regardless of the date of occurrence. Data include cases arising in public employments; and in private employments with the following principal exceptions for which voluntary coverage is permitted: agricultural workers, domestic servants, casual employees, members of the employer's immediate family, certain corporate officers, employees of nonprofit, religious, and charitable institutions, working members of partnerships, certain pilots, real estate brokers, and outworkers. In addition, Federal and railroad employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-217235 MF **A01**
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-Oregon, 1979.
Final rept.
1980, 1303p BLS/SDS/OR-79
Includes seven sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 50 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of the injured or ill worker. Data were compiled by the Oregon Workers' Compensation Board from records of workers' compensation cases received during 1979 which resulted in temporary or permanent disability or death. Data include cases arising in private and public employments with these principal exceptions: public employees of cities over 200,000 who have equivalent coverage; household workers, some casual workers, maintenance workers, nonwage employees of religious, charitable, or relief organizations, sole proprietors, partners, and corporate officers. In addition, Federal employees and some interstate transportation workers are not covered by the State act and cases involving such employees are not included in these data.

PB80-218803 MF **A01**
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses-South Dakota, 1979.
Final rept.
1980, 893p BLS/SDS/SD-79
Includes five sheets of 42X reduction microfiche.
Microfiche copy only.

This document contains 54 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, and age of the injured or ill worker. Data were compiled by the South Dakota State Department of Health from records of workers' compensation cases which occurred during 1979. Data include cases arising in public employments except for some elected or appointed State, county, or local officials, and in private employments with these principal exceptions: farm workers and household workers, for which voluntary coverage is permitted, and persons whose employment is not in the usual course of the trade, business, occupation, or profession of the employer. In addition, Federal and railroad employments are not covered by the State act and cases involving such employees are not included in these data.

SAND-80-1621 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Special Projects Division Quarterly Report of Progress, 1 April-30 June 1980.
Jul 80, 29p
Contract AC04-76DP00789

Draft versions of three additional guidelines documents, designed to facilitate implementation of Environment, Safety, and Health (ES and H) Assurance Programs, were completed this quarter. These include Corporate Emergency Response Program (A Model), ES and H Staff Audit/Appraisal Programs, and Line Organization Internal ES and H Audit/Appraisal Guidelines. In addition, a partial draft of ES and H Assurance Program Information System Guidelines was prepared. This quarter saw the completion of the conceptual design of the ES and H assurance program information system, the identification of a detailed set of information system functions formed into 12 modules or computer program packages, and the initiation of computer programming on these 12 modules. Considerable effort was expended on the subject of safety analysis. A proposed guideline document for OES use was critiqued, and a different approach suggested. (ERA citation 05:031242)

6L. Medical and Hospital Equipment

PB80-226426 PC **A04**/MF **A01**
Avco Everett Research Lab., Inc., Everett, MA.
Complement Biomaterial Interaction.
Final rept. 1 Apr 79-31 Mar 80,
George A. Herzlinger, and Robert D. Cumming.
May 80, 53p NIH-N01-HV-9-2901-1
Contract N01-HV-9-2901

The role of complement activation in mediating cell adhesion at polymer blood contact surfaces was investigated, focusing on (a) determination of the extent and time dependence of complement activation by polymers in contact with whole canine serum, and (b) the effect of in vivo depletion of C3, on cell adhesion to polymers as measured in a canine ex vivo blood flow experiment. The complement activation studies utilized polymers which had been converted to microparticulate form, increasing the polymer/serum interface to greater than 100,000 sq cm/g of material. This permitted direct quantitation of C3 conversion products using Laurell electroimmunoassay. Substantial C3 conversion was found for both polymers studied, nylon 6, 6 and polymethyl methacrylate (PMMA), within a few minutes of serum contact at biological temperature. Conversion, studied in detail for nylon 6, 6, was found to increase with increasing surface area up to maximum level of approximately 18% of total available C3. An identical pattern was seen for zymosan, a known C3 activator. Nylon induced conversion was Ca++ dependent, suggesting involvement of C1, and was highly temperature dependent. Nylon and zymosan particles also aggregated canine platelets in vitro as monitored by standard aggregometry. Cell adhesion to surfaces was studied after profound reduction of C3 levels in vivo with cobra venom factor (CVF)(Naja Haje). CVF had little effect on cell counts, coagulation times, or ADP levels required to induce platelet aggregation in vitro. Both platelet and leukocyte adhesion was sharply reduced in experiments involving CVF treated dogs relative to that seen in identical experiments carried out with normal dogs. The results suggest the involvement of complement activation in mediating leukocyte and platelet adhesion to polymers in the early phases of the blood/surface interaction in the context of the canine model.

PB80-855018 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Laser Technology in Medicine. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 54p
NERACUSGNT0453
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers reports on the use of lasers in biology and medicine. The applications include monitoring and sensing of biological functions, sterilization and coagulation, and excision and surgery. Some articles cover laser hazards to cells and to the eyes. (Contains 046 citations.)

PB80-855026 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Laser Technology in Medicine. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 48p NERACEI NT0453
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers reports on the use of lasers in biology and medicine. The applications include monitoring and sensing of biological functions, sterilization and coagulation, and excision and surgery. Some articles cover laser hazards to cells and to the eyes. (Contains 051 citations.)

PB80-855265 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cardiac Monitors. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Thomas H. Jones. Jul 80, 41p
NERACIAANT0541
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers cardiac output monitoring, including stress and cardiovascular disease effects. Monitoring devices are designed and applied to intensive care units, some stressful jobs, and includes studies on experimental stress onset. Devices reported upon also include non-invasive or contactless techniques. (Contains 030 citations.)

PB80-855273 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Cardiac Monitors. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jul 80, 111p
NERACUSGNT0541
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers cardiac output monitoring, including stress and cardiovascular disease effects. Monitoring devices are designed and applied to intensive care units, some stressful jobs, and includes studies on experimental stress onset. Devices reported upon also include non-invasive or contactless techniques. (Contains 093 citations.)

PB80-855281 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Cardiac Monitors. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jul 80, 78p NERACEI NT0541
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers cardiac output monitoring, including stress and cardiovascular disease effects. Monitoring devices are designed and applied to intensive care units, some stressful jobs, and includes studies on experimental stress onset. Devices reported upon also include non-invasive or contactless techniques. (Contains 063 citations.)

PB80-855299 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Prosthetic Devices. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Thomas H. Jones. Jul 80, 111p
NERACIAANT0449
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers prosthetic device design, material, effectiveness and biological compatibility of the use of such devices. The devices include implants and artificial organs, limbs, bone replacement, and dental materials. The articles cover operation and failure of prosthetic devices, including environmental effects of electric fields or pressure on the biomedical devices. (Contains 114 citations.)

PB80-855307 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Prosthetic Devices. June, 1978-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 78-Jun 80,
Thomas H. Jones. Jul 80, 182p NERACEI NT0449
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers prosthetic device design, material, effectiveness and biological compatibility of the use of such devices. The devices include implants and artificial organs, limbs, bone replacement, and dental materials. The articles cover operation and failure of prosthetic devices, including environmental effects of electric fields or pressure on the biomedical devices. (Contains 160 citations.)

PB80-860000 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Prosthetic Devices. June, 1975-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 75-Jun 80,
Thomas H. Jones. Jul 80, 170p
NERACUSGNT0449
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers prosthetic device design, material, effectiveness and biological compatibility of the use of such devices. The devices include implants and artificial organs, limbs, bone replacement, and dental materials. The articles cover operation and failure of prosthetic devices, including environmental effects of electric fields or pressure on the biomedical devices. (Contains 140 citations.)

6M. Microbiology:

DOE/ET/20604-1 PC A06/MF A01
Woods Hole Oceanographic Institution, MA.
Bioengineering Aspects of Inorganic Carbon Supply to Mass Algal Cultures. Final Report.
J. C. Goldman. Jun 80, 104p
Contract AS02-78ET20604

The work included in this report is part of an ongoing study (currently funded by the Solar Energy Research Institute - Subcontract No. XR-9-8144-1) on the inorganic carbon requirements of microalgae under mass culture conditions and covers the period June 1, 1978 through May 31, 1979. It is divided into two parts appended herein. The first part is a literature review on the inorganic carbon chemical system in relation to algal growth requirements, and the second part deals with the kinetics of inorganic carbon-limited growth of two freshwater chlorophytes including the effect of carbon limitation on cellular chemical composition. Additional experiment research covered under this contract was reported in the Proceedings of the 3rd Annual Biomass Energy Systems Conferences, pp. 25-32, Bicengineering aspects of inorganic carbon supply to mass algal cultures. Report No. SERI/TP-33-265. (ERA citation 05:031197)

PB80-217508 PC$5.00/MF A01
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Isolation and identification of 'Corynebacterium diphtheriae',
Frances O. Sottnek, and J. Michael Miller. Apr 80, 20p HEW/CDC/BL-80/0091

In this monograph, the laboratory isolation and identification of Corynebacterium diphtheriae are described. Also described are the organisms' cellular and colony morphology, procedures for confirming toxigenic C. diphtheriae with in vitro and in vivo tests, and the media and their preparation.

PB80-929703 PC$4.50/MF$3.00
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
The Relationship of Viruses to Human Cancer.
Special listing.
5 Sep 80, 50p NCI/ICRDB/SL-403
Supersedes NTISUB/E/297-006.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: DNA viruses related to human cancer; RNA viruses related to human cancer; Other studies on the role of viruses related to human cancer.

6O. Pharmacology

AD-A088 137/5 PC A02/MF A01
Walter Reed Army Inst of Research Washington DC
Determination of Aprophen and Its Hydrolytic By-Products by Ion-Pair High Performance Liquid Chromatography,
Nesbitt D. Brown, H. Kenneth Sleeman, Bhupendra P. Doctor, and John P. Scovill. 3 Mar 80, 6p
Pub. in Jnl. of Chromatography, v195 p146-150 1980.

No abstract available.

AD-A088 453/6 PC A02/MF A01
Walter Reed Army Inst of Research Washington DC
Effect of Prenatal Drug Administration on Maternal and Neonatal Platelet Aggregation and PF4 Release,
June M. Whaun, Glen R. Smith, and Vera A. Sochor. 15 Jun 79, 14p
Pub. in Haemostasis, v9 p226-237 1980.

No abstract available.

PB80-218449 Not available NTIS
National Bureau of Standards, Washington, DC.
Non-Peptide Impurities in Angiotensin I and Other Commercial Peptides.
Final rept.,
S. A. Margolis, and P. J. Konash. Jun 80, 1p
Pub. in Jnl. of HRC and CC, Short Commun. 3, p317 Jun 80.

Knowledge of the purity of commercial samples of biologically active peptides is essential to the understanding and interpretation of pharmacological and physiological studies with these substances. However, studies in the laboratories show that these peptides are not pure. The origin and nature of these impurities has not been investigated. In this study the authors demonstrate that certain impurities found in angiotensin I might originate from the rubber stopper of the container and the container walls, and others might be introduced during the purification of the crude peptide.

PB80-218522 Not available NTIS
National Bureau of Standards, Washington, DC.
The Traceability Program for Radiopharmaceuticals at the United States National Bureau of Standards.
Final rept.,
L. M. Cavallo, D. B. Golas, and W. B. Mann. Jul-Oct 79, 1p
Pub. in Atomic Energy in Australia 22, n3-4 p55 Jul-Oct 79.

The regulation of the use of radiopharmaceuticals and the traceability of measurements of their activity to the National Radioactivity Measurements System in the United States are described.

PB80-852452 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Chromatography of Pharmaceuticals. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 59p
NERACUSGNT0397
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which discuss the application of chromatography (HPLC, affinity chromatography, gas chromatography and others) to the analysis, assay, recovery, determination, isolation or identification of drugs or pharmaceuticals. (Contains 052 citations.)

PB80-853484 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Disinfectants and Antiseptics. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 95p
NERACUSGNT0491
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover progress in waste water disinfection technology, organics in disinfected waste eater effluents, the role of ozone in water purification, chemistry of disinfectants in water, advances in sterilization and decontamination, and agricultural chemicals and pesticides. A mathematical analysis of the kinetics of viral inactivation is also included in this bibliography. (Contains 077 citations.)

PB80-853492 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Disinfectants and Antiseptics. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Thomas H. Jones. Jun 80, 58p
NERACEDBNT0491

Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover toxicity of disinfectants in domestic and industrial waste waters, alternatives to chlorine for disinfection of waste water, municipal waste water disinfection policy, disinfection of drinking water, and the effects of organic compounds in industrial waste water. (Contains 045 citations.)

PB80-853500 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Disinfectants and Antiseptics. June, 1970-May, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-May 80,
Thomas H. Jones. Jun 80, 114p NERACEI NT0491
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover new approaches to water disinfection, effects of particulates on water disinfection, chlorination and practice, waste water disinfectants, acute residual toxicity of waste water disinfectants, and alternatives to waste water disinfectants. Photodynamic oxidation and photodynamic inactivation of infectious agents are also included in this bibliography. (Contains 108 citations.)

PB80-855315 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Antiradiation Drugs. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Thomas H. Jones. Jul 80, 59p NERACIAANT0493
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers worldwide literature on antiradiation drugs for radiation protection, including the biological efficacy of such drugs and physiological effects of using the drugs. The reports cover experimentation, types of drugs, radiation effects on biological cells, and the protective mechanisms of the agents. In a few cases, results are reported on repairing of biological damage due to radiation by the use of antiradiation drugs. (Contains 051 citations.)

PB80-859978 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Marijuana, Hashish and Related Compounds. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 108p NERACUSGNT0558
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations presented in this bibliography cover the detection, analysis, abuse, prevention, educational programs, psychological, and legals aspects of marijuana/cannabis use. Also included are citations dealing with driver behavior, and such medical use of these drugs as the relief of intraocular pressure and as an anticonvulsant. (Contains 051 citations.)

6P. Physiology

AD-A087 678/9 PC **A02**/MF **A01**
University of Western Ontario London Dept of Psychology
Sex Differences in Functional Brain Asymmetry.
Research bulletin,
Jeannette McGlone. Jul 76, 13p Rept no. RB-378

Adult males show the expected pattern of verbal intellectual decline following left hemisphere lesions, and depressed nonverbal intelligence following right hemisphere lesions. In contrast, women do not show selective verbal or performance intellectual deficits after unilateral brain injury. These findings suggest a greater degree of functional brain asymmetry in men than in women. (Author)

AD-A087 976/3 PC **A02**/MF **A01**
Human Engineering Lab Aberdeen Proving Ground MD
The Effect of Musical Training and Cerebral Asymmetries on Perception of an Auditory Illusion.
Final rept.,
J. D. Craig. 1979, 12p Rept no. HEL-TM-10-80
Pub. in Cortex, v15 p671-677 1979.

No abstract available.

AD-A087 990/8 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Psychology
Pupillometry as a Tool for Psychology.
Technical rept.,
Jackson Beatty. 1979, 3p Rept no. TR-22
Contract N00014-76-C-0616
Pub. in Contemporary Psychology, v24 n6 p204 1979.

No abstract available.

AD-A087 991/6 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Psychology
Neuropsychology and Neurophysiology of Cognition.
Technical rept.,
Jackson Beatty. 1980, 16p Rept no. TR-21
Contract N00014-76-C-0616
Pub. in Proceedings of Annual Conference on Brain Research (11th) p55-68.

No abstract available.

AD-A087 992/4 MF **A01**
California Univ Los Angeles Dept of Psychology
Pupillary Responses during Information Processing Vary with Scholastic Aptitude Test Scores,
Jackson Beatty, and Sylvia Ahern. 21 May 79, 7p Rept no. TR-17
Contract N00014-76-C-0616
Pub. in Science, v205 p1289-1292, 21 Sep 79.
Availability: Microfiche copies only.

No abstract available.

AD-A087 993/2 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Psychology
Physiological Evidence That Demand for Processing Capacity Varies with Intelligence.
Final rept.,
Sylvia Ahern, and Jackson Beatty. 1980, 11p Rept no. TR19
Contract N00014-76-C-0616
Pub. in Intelligence and Learning, p1-9 1980.

No abstract available.

AD-A087 994/0 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Psychology
Pupillometric Signs of Selective Attention in Man,
Jackson Beatty. 1979, 13p Rept no. TR-18
Contract N00014-76-C-0616
Pub. in Neurophysiology and Psychology: Basic Mechanisms and Clinical Applications, p2-10 1980.

No abstract available.

AD-A088 022/9 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Psychology
Pupil Dilation as an Index of Workload.
Interim technical rept.,
Jackson Beatty. 1 Feb 80, 18p Rept no. TR-20
Contract N00014-76-C-0616

The results of a recent series of experiments on task-evoked pupillary responses are reviewed. These data form the basis for a physiological theory of processing resources and mental workload that has practical implications for pilot workload measurement. (Author)

AD-A088 025/2 PC **A03**/MF **A01**
California Univ Los Angeles Dept of Psychology
Task-Evoked Pupillary Responses and Cognitive Processing.
Interim technical rept.,
Jackson Beatty. 1 Feb 80, 29p Rept no. TR-27
Contract N00014-76-C-0616

The current status of the concept of processing resource in cognitive psychology is first presented. Difficulties with a purely behavioral theory of processing resources are then raised. Next the use of a physiological measure, task-evoked changes in pupillary diameter, as a reflection of general processing load is then proposed and the relevant research is reviewed. The measure is shown to yield consistant results across a range of qualitatively different mental tasks. Finally, a hierarchical physiological theory of processing resources is proposed. (Author)

AD-A088 176/3 PC **A04**/MF **A01**
Vanderbilt Univ Nashville TN Dept of Psychology
The Effect of Depth Separation on Lateral Interference.
Technical rept.,
Robert Fox, and Robert E. Patterson. Jul 80, 56p Rept no. N14-1101-80C-0001
Contract N00014-76-C-1101

Lateral interference is a generic term referring to the inhibitory interference among continuously visible adjacent contours that occupy the same plane in depth, e.g., a string of closely spaced alphanumeric characters. Both theoretical considerations and some data suggest that interference or interaction, for several kinds of visual phenomena, may not occur if the interacting elements occupy different depth planes. By generating stimuli as stereoscopic contours formed from dynamic random-element stereograms, the depth position can be easily manipulated without introducing potentially confounding changes in proximal stimulation. This approach in prior research has revealed that the interference between threshold level of transient stimuli, i.e., visual metacontrast masking, is strongly influenced by depth position. The present experiments examined the generality of this observation and determined: (a) if a similar effect is present when one or more of the interacting elements is a supra-threshold, continuously visible stimulus, and (b) if the lateral separation between elements is a significant factor. In four experiments, the interaction between an annulus and a Landolt-C enclosed within it was investigated as a function of their relative depth positions, and of the lateral distance between the inner edge of the annulus and the outer edge of the C.

AD-A088 309/0 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Psychology
A Pupillometric Index of Operator Workload.
Interim technical rept.,
Jackson Beatty. 1 Feb 80, 19p Rept no. TR-23
Contracts N00014-76-C-0616, N00014-77-C-0030

The momentary workload that is imposed by a cognitive task upon the limited capacity human information-processing system appears to be accurately reflected in the momentary level of central nervous system activation. The utility of pupillometric methods of workload assessment is evaluated and several lines of experimental evidence relating activation and cognitive function are reviewed. (Author)

AD-A088 334/8 PC **A02**/MF **A01**
Florida State Univ Tallahassee Dept of Psychology
Evoked Response Measures of Resource Allocation: Effects of Primary Task Load.
Final scientific rept. 1 Jun 79-30 May 80,
L. F. Elfner, R. R. Stanny, and W. R. Howse. 31 May 80, 11p AFOSR-TR-80-0597
Grant AFOSR-79-0097

The major emphasis of the research was to assess the utility of employing event-related potentials in monitor type tasks. The 'work manipulation' paradigm was employed. Auditory probes were presented along a secondary channel unrelated to the perceptual-motor task. In the initial study amplitude and latency measures of Wave V of the brain stem evoked potential were measured to auditory probes under conditions of tracking a visual target with a joystick, and just observing the visual display. It was noted that a reduction in amplitude and

an increase in latency of Wave V occurred during the tracking task. Although not statistically significant all subjects demonstrated the same effect. (Author)

AD-A088 372/8 PC **A03**/MF **A01**
North Carolina Univ At Chapel Hill Dept of Surgery
Brain Neurotransmitter and High Energy Phosphate Concentration after Combined Hypoxia and Hypotension.
Annual rept. 1 Aug 79-31 Jul 80,
H. J. Proctor, R. A. Mueller, W. G. Palladino, and G. R. Breese. 15 Aug 80, 32p
Contract N00014-79-C-0852

Previous work by the authors has established decreased brain ATP concentration after a combined hypoxic-hypotensive episode. This study was undertaken to determine what changes, if any, occur in brain norepinephrine (NE), dopamine (DA) and serotonin (5HT) concentration in association with hypoxia and hypotension, and to correlate any observed changes with simultaneously measured ATP concentrations. Rats were subjected to a 30 minute period of hypoxia (FI02 = .075) and hemorrhagic hypotension (MAP - 30 mm Hg) and then resuscitated. Significant increases ($p < .05$) in cortical 5HT and DA concentrations were observed, at a time when ATP concentration was significantly ($p < .005$) reduced. Additional experiments were conducted on rats depleted of 5HT by prior treatement with 5,7-dihydroxytryptamine. Equal decreases in ATP concentration were measured, and the cardio-vascular response to hypoxic-hypotension in 5HT depleted rats was similar to 5HT intact rats. We conclude that the increased 5HT after hypoxic-hypotension does not cause the decreased ATP concentration, nor does 5HT play a major role in cardio-vascular homeostasis under the conditions of this experiment. (Author)

IAEA-R-1819-F PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Kinetics of Renal Organic Acid Transport; Studies on the Counter-Transport of p-Aminohippuric Acid. Final Report for the Period 1 August 1976 - 31 October 1978.
Y. S. Park. Apr 79, 32p
U.S. Sales Only.

The experiments have been performed in various conditions using exp 14 C-PAH as a tracer. The relative ratio of the inhibitor constant (Ki) between Diodrast and probenocid was of the same magnitude as the concentrations of these inhibitors for maximal stimulation of PAH efflux. The author observed that in metabolically inhibited slices, there was no PAH uptake against concentration gradient, but the efflux of PAH was greater than that in the normal slice. In these metabolically inhibited slice PAH efflux was also biphasically altered by Diodrast and probenecid added to the medium. When the concentration of sodium was reduced in medium, PAH influx was decreased but PAH efflux facilitated. 0.1mM disulfonic stilbene derivative, SITS (4-acetamido-4'-isothiocyano-2.2' disulfonic stilbene) increased PAH efflux in the normal slice, but decreased the efflux in the metabolically inhibited slice. Analyzing the data presented, the contractor came to the conclusion that the influx and efflux of PAH in the renal slice are mediated by mobile carrier cycling across the peritubular membrane of renal tubular cell. He observed also that the affinity of carrier for organic acids is altered by the energy-linking reaction at the cytoplasmic border of the membrane. (Atomindex citation 11:508349)

LMF-68 PC **A03**/MF **A01**
Lovelace Foundation for Medical Education and Research, Albuquerque, NM. Inhalation Toxicology Research Inst.
Respiratory Measurements in Small Laboratory Mammals: A Literature Review.
S. A. Likens, and J. L. Mauderly. Jul 79, 49p
Contract AC04-76EV01013

Reports pertaining to the measurement of respiratory variables in small laboratory mammals have been collected from the open literature. The techniques reported from 1941 to June 1978 for measurement of breathing pattern, lung volumes, transpulmonary pressure, lung mechanics and gas exchange in small mammals are presented. A brief chronological history of publication of these techniques and a listing of typical applications is also included. Reported values for healthy mice, rats, hamsters, guinea pigs and rabbits have been summarized in tubular form. (ERA citation 05:031200)

PB80-851348 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rheology of Blood. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Aug 80, 60p
NERACUSGNT0403
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited from worldwide literature dealing with the rheology of blood, including shear flow, fluid dynamics and fluid mechanics. Also discussed are studies on blood flow in connection with blood circulation, blood pressure and blood diseases, such as sickle cell anemia. Measurement and mathematical modeling of blood flow are presented as well. (Contains 059 citations.)

PB80-851355 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rheology of Blood. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Aug 80, 41p NERACEI NT0403
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography cites reports dealing with the rheology of blood (hemorheology), including hemodynamics, measurement of flow, mathematical modeling and biomedical engineering. Synovial fluid rheology is also mentioned. (Contains 187 citations.)

6Q. Protective Equipment

AD-A088 099/7 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Hearing Protection and Speech Communication Characteristics of Selected USAF Inflight Helmets.
Technical rept.,
Mark R. Stephenson, and Donald G. Tomerlin. Jun 80, 21p Rept no. AFAMRL-TR-80-37

Hearing protection and speech intelligibility were measured on three widely used flight helmets: the HGU-26/P with standard earcups, HGU-26/P with custom earcups and the DH-151. The following results were obtained: (1) Attenuation tests demonstrated the DH-151 and the standard HGU-26/P generally provide equivalent hearing protection with the former providing somewhat greater protection at the low and high frequencies, but the latter providing somewhat greater protection at the middle frequency region. The custom HGU-26/P provided less hearing protection than both of the above. (2) Replacing earcup assemblies with standard MX8376/AR earcups resulted in equal or improved hearing protection for the HGU-26/P helmet. In the DH-151 helmet, this resulted in less protection at the lower frequencies, but improved protection in the middle frequency range, and no change in the higher frequency range. (3) Speech intelligibility was determined by calculating the articulation index. Both the standard HGU-26/P and the DH-151 provide excellent speech intelligibility. The custom HGU-26/P was found to provide less speech intelligibility than the other two helmets. Never-the-less, we believe it would also permit adequate inflight speech communication. (Author)

NUREG/CR-1586 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Respirator Studies for the Nuclear Regulatory Commission, October 1, 1978-September 30, 1979: Evaluation and Performance of Escape-Type Self-Contained Breathing Apparatus.
Progress rept.,
Alan Hack, Andres Trujillo, Keith Carter, and O. D. Bradley. Jul 80, 18p LA-8432-PR
Contract W-7405-eng-36

The performance of escape type breathing apparatus was evaluated for weight, comfort, ease of use, and protection factor (calculated from facepiece leakage). All of the devices tested provided a self-contained air supply of 5- to 15-min duration. Five of them have the provision to connect an air line but allow the use of the self-contained supply for safe egress. The air supply was stored in cylinders, tubing, or disposable containers. Respiratory inlet coverings were half masks, full facepieces, hoods, and mouthpieces. An estimate is given for the ease of quick donning. Recommendations for conditions of use of the equipment are given.

PB80-853682 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Clothing Manufacturing. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 54p NERACUSGNT0586
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the manufacturing, processing, and marketing of men's, women's, and children's apparel, including footwear and textiles. Citations include descriptions of processing equipment, nonflammable finishes, protective clothing, and health hazards in the industry. (Contains 033 citations.)

6R. Radiobiology

AD-A087 882/7 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Penetration of Gaseous I131 Through Human Skin.
S. M. Gorodinskii, L. S. Yes'kova-Soskovets, M. I. Rokhlin, Yu. Ya. Sokolov, and A. D. Turkin. 21 Dec 79, 14p Rept no. FTD-ID(RS)T-1942-79
Edited trans. of Raspredeleniye, Kinetika Obmena i Biologicheskoye Deystviye Radioaktivnykh Izotopov Yoda (USSR) p68-71 1970, by Gale M. Weisenbarger.

No abstract available.

AD-A088 067/4 PC **A04**/MF **A01**
Georgia Inst of Tech Atlanta Engineering Experiment Station
Investigation of Radiofrequency Radiation Effects on Excitable Tissues.
Annual technical rept. no. 1, 1 Mar 79-29 Feb 80,
Everette C. Burdette, R. L. Seaman, and R. L. DeHaan. 30 Apr 80, 58p GIT/EES-A-2335, AFOSR-TR-80-0596
Contract F49620-79-C-0055

The effects of 2450-MHz radiofrequency radiation (RFR) on excitable membranes were studied. Spherical aggregates of cultured chick cardiac cells were used as the model excitable tissue. An exposure device was developed to deliver known amounts of RFR energy to the aggregate preparation. The device consists of a 1/4-inch semi-rigid coaxial cable which opens into a circular brass plate that serves as a ground plane. In our experiments, the brass plate is also used for regulated heating. The fringing field extending above the device aperture effectively couples to the culture medium in a 35-mm circular dish, with negligible radiated field outside the medium. The Specific Absorption Rate (SAR) inside the culture dish for two volumes of media was determined from measurements of electric fields and temperatures. Small dipole (2.9-mm) and monopole (2.7-mm) probes were used to perform field intensity measurements and 0.4-mm diameter high-resistivity thermistors attached to resistive leads were used to measure temperature rise. SAR was accurately determined as a function of input power and of position in the dish, with the maximum occurring at the center. The trends for greater variability have been suggested by all maximum upstroke velocity and interest interval data analyzed and are consistent with an RF perturbation of membrane molecular com-

ponents. Additional studies are underway to see whether bulk heating can account for observed variabilities.

AD-A088 322/3 PC **A06**/MF **A01**
National Research Council Washington DC Panel on the Extent of Radiation From the PAVE PAWS Radar System
Analysis of the Exposure Levels and Potential Biologic Effects of the PAVE PAWS Radar System.
Technical rept.
1979, 109p AFSC-TR-80-11
Contract F49620-78-C-0118

This report represents an analysis of the extent of radiation and the exposure of the public from the Pave Paws system as made by the Assembly of Life Sciences of the National Research Council in 1979. (Author)

AD-A088 467/6 PC **A03**/MF **A01**
Harry Diamond Labs Adelphi MD
Safety Considerations and Biological Hazards of the Near-Millimeter Wave Region.
Special rept.,
Edward A. Brown. Jul 80, 30p Rept no. HDL-SR-80-8

This report is an annex to the Near-Millimeter Wave Technology Base Study. It contains a survey of the most recent literature dealing with the question of biological hazards that may be encountered while working with sources of near-millimeter wave (NMMW) radiation. There is currently a severe lack of data in the NMMW frequency region (100 to 1000 GHz). Thus, most of the conclusions take the form of extrapolations from work done at lower frequencies. The highly controversial issue of possible nonthermal effects is considered. (Author)

AD-A088 519/4 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Radiac Dosimeter Calibration Accuracy.
Final rept. on test operations procedure.
11 Jul 80, 13p Rept no. TOP-8-2-550
See also Rept. no. MTP-6-3-335, AD-720 567, MTP-8-2-171 and MTP-8-2-172, AD-718 737 and TOP-6-2-552, AD-A082 639.

A procedure to standardize methods to determine the accuracy of dosimeters over the range of 80 KEV to 3 MEV. To be conducted within a secure area of maximum radiation rate 2 milliroentgen per hour. Calibration is scored against US Army secondary standards. Developed for field or tactical type meters. (Author)

BNL-28065 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
DNA Damage and Carcinogenesis.
R. B. Stelow. 1980, 10p
Contract AC02-76CH00016

Although cancer may arise as a result of many different types of molecular changes, there is little reason to doubt that changes to DNA are one of the more important ones in cancer initiation. Although DNA repair mechanisms seem able to eliminate a very large fraction of deleterious changes to DNA, we not only have little insight into the molecular mechanisms involved in such repair, but have a negligible amount of information to permit us to estimate the shape of dose response relations at low doses. The case of skin cancer is a special one, in that the average population is exposed to sufficient solar uv so that the effects of small increments in uv dose may be estimated. An approximate 85% reduction in DNA repair increases skin cancer incidence 10 exp 4 fold. (ERA citation 05:029719)

GSF-S-586 PC **A03**/MF **A01**
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H., Neuherberg (Germany, F.R.). Inst. fuer Strahlenschutz.
Lead-210, Bismuth-210, Polonium-210. Natural Activity, Internal Dosimetry, and Dose Factors for Ingestion and Inhalation.
W. Jacobi. Feb 79, 37p
In German.
U.S. Sales Only.

Starting with a comprehensive review of the normal, natural activity of exp 210 Pb and exp 210 Po in the environment and in the tissues of the human body, a model of the activity and dose distributions of this nuclides in the human body is developed. Dose factors for ingestion with food and for inhalation are derived from this model, related to the intake rate unit. This 'natural exposure model' can be used for an estimation of the population exposure due to normal natural radiation as well as to man-made sourcess of these nuclides, e.g. coal-fired power plants. (Atomindex citation 11:508412)

IAEA-R-1457-F PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Improvement of Antifungal and Antibacterial Antibiotic Producing Strain of Bacillus Subtilis AFCI-69 by Radiation and Chemical Mutagens. Part of a Coordinated Programme on Radiation Biology. Final Report for the Period 1 January 1974 - 28 February 1977.
M. S. Ahmad. Aug 78, 26p
U.S. Sales Only.

Gamma radiation was used to select higher antibiotic yield mutants of Bacillus subtilis AECL 69. The test organisms were Aspergillus niger RAGENI 70 and Staphylococcus aureus 6571 (16) N.C.T.C. Searches for fermentation, purification and characterization of antibiotics of parent strain and its mutants were carried out. (Atomindex citation 11:508167)

IAEA-R-2006-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Determination of Possible Radiation Hazards Associated with Tin Mining Industry in West Malaysia. Final Report for the Period 1 September 1977 - 31 December 1978.
S. J. Hu. Apr 79, 20p
U.S. Sales Only.

A study was made in Malaysia under an IAEA research contract on the possible radiation hazards associated with tin mining industry in Malaysia. The study comprised of the measurement of external radiation levels in various mines, gamma-ray spectrometric analysis of various samples from mines, and measurements of radon and radon daughters concentrations. For radon daughters modified Tsivoglou and Kusnetz methods were used. The study showed that there is, in general, no radiation hazard associated with the tin mining industry in West Malaysia. However, the only likely source that might pose some external radiation hazard is the amang upgrading plant which invariably concentrates either or both exp 232 Th and exp 238 U in the final products of the upgrading process. A quantitative and thorough investigation of radiation levels in the amang upgrading industry is necessary to determine the degree of hazard. No significant radon or radon daughters concentrations were noted in the underground mines. (Atomindex citation 11:508409)

INIS-mf-4463 PC **A06**/MF **A01**
Association Euratom-ITAL, Wageningen (Netherlands).
Application of Atomic Energy in Agriculture. Annual Report 1977.
1978, 123p
U.S. Sales Only.

A state-of-the-art survey of current research is presented in the form of a series of short articles which includes X-ray dosimetry intercomparison (EULEP), testing of lyoluminescent materials for the 25-krad to 2.5-Mrad dose range, behaviour of radioactive and nonradioactive pollutants in soils and plants (also fallout), plant nutrition in relation to soils, Experimental Soil-Plant-Atmosphere System tests, nitrogen fixation, gene mutations and chromosome manipulation in both legumes and ornamental plants, incompatibility studies, radiation mutagenesis, crop protection by genetic control of insects, food sterilization and preservation by irradiation, and waste irradiation. An outline is given of the research plans for the coming four years and the international cooperation involved. A survey of the outward services, lectures, publications and conference participation is presented at the end. (Atomindex citation 09:408975)

NDRL-2107 PC **A02**/MF **A01**
Notre Dame Univ., IN. Radiation Lab.
Studies of Radiation Induced Peroxidation in Fatty Acid Micelles.
L. K. Patterson. 1980, 9p CONF-800591-1
Contract AC02-76ER00038
International conference on oxygen and oxy-radicals in chemistry and biology, Austin, TX, USA, 26 May 1980.

Studies of irradiation induced lipid peroxidation in fatty acid micelles, both from our own lab and others, are briefly summarized. Steady state measurements have shown the dependence of hydroperoxide yield on the state of aggregation in the lipid and the degree to which the reactive sites are close packed. Chromatographic measurements obeyed the square root dependence of yield on dose rate confirming the proposed chain mechanism. Application to antioxidant studies have demonstrated the highly efficient blockage of the peroxidation chain by alpha -tocopherol and the subsequent prooxidant effect of the product formed. Time resolved studies have been used to determine rate information for .OH-lipid interaction, radical transfer within the lipid, radical peroxidation, lipid radical movement across the micellar boundary, chain termination, and radical interaction with alpha -tocopherol. Complimentary laser studies have demonstrated, in contrast to .OH behavior, the comparatively high degree of selectively exhibited by alkoxy radicals toward allylic lipid sites. (ERA citation 05:029710)

RHO-SA-153 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Surface Soil Contamination Standards for Rockwell Hanford Operations.
G. F. Boothe. 1979, 18p CONF-791234-6
Contract AC06-77RL10130
Environmental decontamination workshop, Oak Ridge, TN, USA, 4 Dec 1979.

The four basic radiation protection criteria (external radiation, ingestion of radioactivity, concentrations of radioactivity in air, and concentrations of radioactivity in water) can be met for each type of contamination by deriving contamination limits in the manner described below and adopting the most restrictive limit as a standard. Four separate limits for average soil contamination are developed below. These limits are derived from four conditions that may result in human radiation dose: external radiation, ingestion of soil, airborne radioactivity, and radioactivity in water. The most restrictive limit for each radionuclide is taken as the average surface soil contamination standard. The average surface soil contamination standard is then used to develop areal contamination standards and spot contamination standards. (ERA citation 05:029847)

6S. Stress Physiology

AD-A087 980/9 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Frank Orthogonal Vectorcardiograms in Humans during and after Exposure to +G2 Acceleration Stress,
M. Harold Laughlin, James E. Whinnery, Joel A. Storm, Donald J. Cosgrove, and Edward L. Fitzpatrick. 1980, 10p Rept no. SAM-TR-80-223
Pub. in Aviation, Space, and Environmental Medicine, V50 n7 p653-660 Jul 80.

No abstract available.

AD-A088 028/6 PC **A03**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
Towards a Better Understanding of Temporary Threshold Shift of Hearing.
Technical memo.,
K. R. Maslen. Mar 80, 50p RAE-TM-FS-319, DRIC-BR-73973

It was thought that Temporary Threshold Shift of hearing due to exposure to noise might be more easily understood if the shifts were considered in terms of the rms pressure rather than in dB. There-

fore, the forms to be expected if the rate of shift of the pressure threshold were proportional to the difference between itself and the ultimate threshold were calculated, and compared with a limited selection of published data. Good agreement with data for the growth of TTS in individuals was found, and moderately good agreement with recovery. Agreement with data on intermittent exposures was poor, but this may be due in part to the fact that only averaged data have been found, and averaging the widely disparate figures obtained for individuals may mask the true effects. It is also shown that the maximum ultimate TTS due exposure to noise may be simply related to the mean square pressure of that noise. Further consideration of the mass of published work is needed, but this study suggests that at least some facets of TTS can be simply described in terms of exponential pressure shifts. (Author)

AD-A088 259/7 PC **A07/MF A01**
Naval Health Research Center San Diego CA
Use of Physiological Measures to Monitor Operator State.
Interim rept.,
Laverne C. Johnson. 1980, 134p Rept no. NAVHLTHRSCHC-78-27
Pub. in Biocybernetic Applications for Military Systems, rept. no. MDC-E2191, p101-132 May 80.

No abstract available.

AD-A950 015/8 PC **A02/MF A01**
Office of the Surgeon General (Army) Washington DC
Princeton Studies of Sensory Deprivation.
Final rept. 1 Sep 55-31 Aug 61,
Jack A. Vernon. 31 Aug 61, 23p

No abstract available.

N80-30038/7 PC **A02/MF A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Assessment of the Effects of the Zero Gravity Environment on the Health and Safety of Space Workers.
18 Feb 80, 17p NASA-TM-81122, DOE/CH-10025
Contract DE-AI02-79CH-10025

A review was conducted of currently available information relating to adverse effects to the health and safety that space power system (SPS) space workers may experience. Currently available information on the responses of humans to space flight is somewhat limited and was obtained under conditions which are grossly different from conditions to be experienced by future space workers. The limitations in information and differences in conditions were considered in the assessment of potential health and safety hazards to the SPS space workers. The study did not disclose any adverse effects that would result in long term deviations to the medical physiological health of space workers so long as proper preventive or ameliorating action were taken.

PB80-851330 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Electromyography. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Aug 80, 103p NERACEI NT0499
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers literature on that aspect of biomedical engineering pertaining to electromyography. The reports cover electromyographic data on locomotion, prosthetic movements, pacemakers, biofeedback, and other myoelectric signals from contracting muscle. Some abstracts cover interference from humidity or perspiration on myoelectric-operated devices. Abstracts also include design and application of electrodes, display devices, and processors used in myoelectric studies, and report on the interpretation, characterization and pattern recognition of the EMG signals. (Contains 090 citations.)

PB80-854037 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Gravitational Effects in Biology, Exobiology, and Physiology. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 64p NERACUSGNT1258
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the biological and physiological effects of zero, low and high gravity environments upon plants, human and other animals, and upon various types of living cells are contained in this retrospective bibliography. (Contains 058 citations.)

PB80-854045 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Gravitational Effects in Aerospace Applications. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 41p NERACEI NT1259
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on gravitational effects in plasmas and in fluid dynamics in various applications are contained in this retrospective bibliography. (Contains 095 citations.)

PB80-854052 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Gravitational Effects in Biology, Exobiology, and Physiology. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
John H. Frey. Jun 80, 160p NERACIAANT1258
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the biological and physiological effects of zero, low and high gravity environments upon plants, human and other animals, and upon various types of living cells are contained in this retrospective bibliography. (Contains 150 citations.)

PB80-855034 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Electromyography. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Thomas H. Jones. Jun 80, 137p
NERACIAANT0499
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers literature on that aspect of biomedical engineering pertaining to electromyography. The reports cover electromyographic data on locomotion, prosthetic movements, pacemakers, biofeedback, and other myoelectric signals from contracting muscle. Some abstracts cover interference from humidity or perspiration on myoelectric-operated devices. Abstracts also include design and application of electrodes, display devices, and processors used in myoelectric pattern recognition of the EMG signals. (Contains 135 citations.)

6T. Toxicology

AD-A088 427/0 PC **A02/MF A01**
Naval Medical Research Inst Bethesda MD
Effects of Oxygen and Carbon Dioxide on Carbon Monoxide Toxicity.
Medical research progress rept.,
F. Lee Rodkey, and Harold A. Collison. 5 Mar 79, 7p Rept no. NMRI-79-0112
Pub. in Jnl. of Combustion Toxicology, v6 p208-212 1979.

No abstract available.

AD-A088 432/0 PC **A02/MF A01**
Naval Medical Research Inst Bethesda MD
Saturable Metabolism and the Acute Toxicity of 1,1-Dichloroethylene.
Medical research progress rept.,
Melvin E. Andersen, John E. French, Michael L. Gargas, Robert A. Jones, and Lawrence J. Jenkins, Jr. 15 Jun 78, 12p Rept no. NMRI-79-0117
Pub. in Toxicology and Applied Pharmacology, v47 p385-393 1979.

No abstract available.

AD-A088 433/8 PC **A02/MF A01**
Naval Medical Research Inst Bethesda MD
The Use of Inhalation Techniques to Assess the Kinetic Constants of 1,1-Dichloroethylene Metabolism.
Medical research progress rept.,
Melvin E. Andersen, Michael L. Gargas, Robert A. Jones, and Lawrence J. Jenkins, Jr. 15 Jun 78, 18p Rept no. NMRI-79-0118
Pub. in Toxicology and Applied Pharmacology, v47 p395-409 1979.

No abstract available.

AD-A088 525/1 PC **A02/MF A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
The Impact on DoD of the Toxic Substances Control Act.
Technical rept.,
Kenneth C. Back. Jun 80, 12p Rept no. AFAMRL-TR-80-69

There are a number of driving factors which markedly affect the utilization and acquisition of new chemicals within the Department of Defense and throughout the national industrial community. The Toxic Substances Control Act of 1976 and other previous legislations have mandated complete series of test standards designed to identify chemical hazards and establishing minimum requirements for performing acute, subacute, and chronic toxicity tests, mutagenic effects, teratogenic effects, oncogenic effects and metabolic effects on both flora and fauna. A scheme for obtaining these data, and the relative time and expense necessary to assess chemical hazards is discussed along with case-in-point chemical data on ram jet fuels illustrating potential problem areas of such legislation. (Author)

CONF-800498-1 PC **A03/MF A01**
Oak Ridge National Lab., TN.
Studies on the Mechanisms of Action of Modifiers of Skin Carcinogenesis.
T. J. Slaga. 1980, 37p
Contract W-7405-ENG-26
Symposium on mutagenesis and carcinogenesis, Warsaw, Poland, 21 Apr 1980.

Skin tumors can be induced by the sequential application of a subthreshold dose of a carcinogen (initiaton phase), followed by repetitive treatment with a weak or noncarcinogenic tumor promoter. There is a very good dose-response relationship between the induction of the number of papiliomas per mouse at early times (10 to 20 weeks) by either tumor initiators and promoters and the final carcinoma incidence after a longer latency (20 to 50 weeks) in SENCAR mice. This system not only can be used to determine the tumor initiating and promoting activities of a compound but if the agent is given repeatedly by itself one can also determine if it is a complete carcinogen, i.e., if it has both tumor initiating and promoting activity. There is a good correlation between the tumor-initiating activities of PAH and their abilities to bind covalently to DNA. In addition, various inhibitors of PAH tumor initiation show a strong correlation with their abilities to inhibit the binding of the PAH to DNA and their anti-tumor initiating activities. There is also a good correlation between the promoting abilities of phorbil esters to promote tumors and their abilities to induce ornithine decarboxylase (ODC), cell proliferation and dark basal keratinocytes. However, when other nonpromoting hyperplastic agents are used only dark cell induction correlates. Certain polyamines and prostaglandins can enhance phorbol ester tumor promotion. Anti-inflammatory steroids, retinoids and protease inhibitors are potent inhibitors of tumor promotion. They inhibit tumor promotion by either inhibiting the 12-0-tetradecanoylphorbol-13-acetate (TPA)induced

cell proliferation, ODC and/or dark basal keratinocytes. Certain weak promoters such as mezerein which mimics TPA in many biochemical and morphological effects are potent second step promoters in a two-stage promotion regimen. (ERA citation 05:031231)

CONF-800680-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Toxicity of Shale Oil to Freshwater Algae: Comparisons with Petroleum and Coal-Derived Oils.
J. M. Giddings. 1980, 15p
Contract W-7405-ENG-26
Symposium on health effects investigations of oil shale development, Gatlinburg, TN, USA, 23 Jun 1980.

The toxicities of various water-soluble fractions of Paraho/SOHIO shale oils and coal liquefaction products to the algae Selenastrum capricornutum and Microcystis aeruginosa are investigated. Photosynthetic inhibition is the criterion of toxicity. A secondary objective of the algal bioassay is determination of the range of toxic concentrations. (ERA citation 05:031230)

DOE/ET/13557-14 PC **A02**/MF **A01**
Meyer (A.F.) and Associates, Inc., McLean, VA.
Evaluation of the Mouse Micronucleus Test as Compared with the in Vivo Cytogenics Test for Mutagenicity of Synthetic Fuel Materials. Topical Report.
9 Mar 80, 7p
Contract AC02-79ET13557

This brief topical report, provides information on a comparison of the mouse micronucleus mutagenic test proposed by a DOE contractor (FMC) for coal derived chemicals; as compared with the in vivo cytogenic test. The latter procedure is repotedly preferred by EPA authorities connected with implementation of the toxic substances control act (TOSCA). This evaluation was performed at the request of Headquarters DOE program management staff. The mouse micronucleus test takes less time and costs approximately one-fourth that of the in vivo cytogenetic procedure. This topical report is written to the extent possible in non-technical language to present conclusions associated with the evaluation rather than a detailed scientific dissertation. (ERA citation 05:031227)

PB80-225139 PC **A06**/MF **A01**
Battelle Columbus Toxicology Program Office, Vienna, VA.
Acute Cardiovascular Effects of Cis-Platinum (NSC-119875) Following Continuous Intravenous Infusion to Anesthetized Beaglehounds.
Final rept. 15 May-7 Aug 79,
R. L. Hamlin, F. S. Pipers, P. Mihalko, T. J. Miller, and M. S. Frick. Apr 80, 120p
Contract N01-CM-4-3746
Prepared by Ohio State Univ., Columbus. Dept. of Veterinary Physiology and Pharmacology, Rept. no. OSU-RHFP-119875-30.

Healthy beaglehounds were anesthetized with Innovar-vet and sodium pentobarbital and instrumented to record various cardiovascular parameters and electroencephalograms (EEG). After two control recordings 15 minutes apart, they were given intravenously in a single bolus Cis-Platinum in doses 5, 10 or 20 mg/kg (100, 200 or 400 mg/cu m) body weight, and recordings were made 5, 20, 40 and 60 minutes after administration. All dogs survived the 60 minutes of surveillance; however, 3 of the 6 dogs receiving the highest dose died within 3 hours with apparent respiratory distress. An occasional dog receiving each dose developed tachypnea and 1 dog receiving an intermediate dose developed transient sinus tachycardia while 1 dog receiving the highest dose developed a sustained sinus tachycardia. Left ventricular end-diastolic pressure decreased in both control groups and in dogs receiving the high and low doses. Cardiac output increased at 5 and 20 minutes only in dogs receiving the intermediate dose. No changes in dLVP/dt max were observed. Pulmonary trunk pressures did not change, but systemic arterial pressure increased at all times in dogs receiving the high dose. No systematic alterations in either ECGs or EEGs were observed. In the doses given and for the period of surveillance, this compound produced no alterations of profound clinical or physiologic significance.

PB80-851272 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Beryllium. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Thomas H. Jones. Jun 80, 70p
NERACEDBNT0409
Sponsored in part by National Technical Information Service, Springfield, VA.

These abstracts cover the health hazards, actual and potential carcinogenicity, and other toxic/adverse effects of beryllium, on humans, plants and animals. They include not only the effects, but the detection, characterization, and removal of beryllium in both atmospheric and aquatic systems. In addition, there are a number of abstracts dealing with the analysis, detection, and removal of traces of beryllium in coal combustion effluent gas and extraction/processing plants. (Contains 045 citations.)

PB80-851314 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Arsenic. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 156p
NERACUSGNT0407
Sponsored in part by National Technical Information Service, Springfield, VA.

These reports cover the toxicity, carcinogenicity, environmental pollution, and other hazards and adverse effects of arsenic. The detection, characterization, analytical methods, standards, and removal from the environment are reported. These aspects of arsenic are dealt with in relation to aquatic and terrestrial flora and fauna, including humans, and in such areas as the effluent from coal fired and geothermal power plants. (Contains 109 citations.)

PB80-851322 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Arsenic. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Thomas H. Jones. Jun 80, 147p
NERACEDBNT0407
Sponsored in part by National Technical Information Service, Springfield, VA.

These reports cover the toxicity, carcinogenicity, environmental pollution, and other hazards and adverse effects of arsenic. The detection, characterization, analytical methods, standards, and removal from the environment are reported. These aspects of arsenic are dealt with in relation to aquatic and terrestrial flora and fauna, including humans, and in such areas as the effluent from coal fired and geothermal power plants. (Contains 104 citations.)

PB80-851520 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Tin. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 48p
NERACUSGNT0551
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover geochemistry and the environment, maternal-fetal tissue levels, assessment of industrial hazardous waste practices, health hazard evaluation or toxicity reports, and NIOSH analytical methods. A study of waste generation, treatment and disposal in the metals mining industry is also included in this bibliography. (Contains 031 citations.)

PB80-852684 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Zinc. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 168p
NERACUSGNT0420
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers transport in the environment and toxic dosage of zinc ions. Health effects related to zinc uptake are discussed in studies of aquatic environment, animal tests and human populations. Some abstracts discuss emissions in the atmosphere of trace element zinc, including monitoring techniques and eventual accumulations in the environment. (Contains 121 citations.)

PB80-852692 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Zinc. July, 1975-May, 1980 (Citations from the Energy Data Base).
Rept. for Jul 75-May 80,
Thomas H. Jones. Jun 80, 197p
NERACEDBNT0420
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers transport in the environment and toxic dosage of zinc ions. Health effects related to zinc uptake are discussed in studies of aquatic environment, animal tests and human populations. Some abstracts discuss emissions in the atmosphere of trace element zinc, including monitoring techniques and eventual accumulations in the environment. (Contains 159 citations.)

PB80-852700 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Selenium. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 74p
NERACUSGNT0419
Sponsored in part by National Technical Information Service. Springfield, VA.

These reports cover the toxicity, carcinogenicity, environmental pollution, and other hazards and adverse effects of selenium. The detection, characterization, analytical methods, standards, and removal from the environment are reported. These aspects of selenium are dealt with in relation to aquatic and terrestrial flora and fauna, including humans, and in such areas as the effluent from coal fired and geothermal power plants. (Contains 050 citations.)

PB80-852718 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Selenium. June, 1970-June, 1980 (Citations from the Energy Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 90p
NERACEDBNT0419
Sponsored in part by National Technical Information Service, Springfield, VA.

These reports cover the toxicity, carcinogenicity, environmental pollution, and other hazards and adverse effects of selenium. The detection, characterization, analytical methods, standards, and removal from the environment are reported. These aspects of selenium are dealt with in relation to aquatic and terrestrial flora and fauna, including humans, and in such areas as the effluent from coal fired and geothermal power plants. (Contains 064 citations.)

PB80-852726 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Nickel. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 97p
NERACUSGNT0418
Sponsored in part by National Technical Information Service, Springfield, VA.

These reports cover the toxicity, carcinogenicity, environmental pollution and other hazards and adverse effects of nickel. The detection, characterization, analytical methods, standards, and removal from the environment are reported. These aspects of nickel are dealt with in relation to aquatic and terrestrial flora and fauna, including humans, and in such areas as occupational exposures. (Contains 073 citations.)

PB80-852734 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Nickel. July, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jul 76-May 80,
Thomas H. Jones. Jun 80, 138p
NERACEDBNT0418
Sponsored in part by National Technical Information Service, Springfield, VA.

These reports cover the toxicity, carcinogenicity, environmental pollution and other hazards and adverse effects of nickel. The detection, characterization, analytical methods, standards, and removal from the environment are reported. These aspects of nickel are dealt with in relation to aquatic and terrestrial flora and fauna, including humans, and in such areas as occupational exposures. (Contains 095 citations.)

PB80-852742 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Manganese. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 100p
NERACUSGNT0416
Sponsored in part by National Technical Information Service, Springfield, VA.

These reports cover the toxicity, carcinogenicity, environmental pollution, and other hazards and adverse effects of manganese. The detection, characterization, analytical methods, standards, and removal from the environment are reported. These aspects of manganese are dealt with in relation to aquatic and terrestrial flora and fauna, including humans, and in such areas as mining operations. (Contains 068 citations.)

PB80-852759 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Manganese. July, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jul 76-May 80,
Thomas H. Jones. Jun 80, 96p
NERACEDBNT0416
Sponsored in part by National Technical Information Service, Springfield, VA.

These reports cover the toxicity, carcinogenicity, environmental pollution, and other hazards and adverse effects of manganese. The detection, characterization, analytical methods, standards, and removal from the environment are reported. These aspects of manganese are dealt with in relation to aquatic and terrestrial flora and fauna, including humans, and in such areas as mining operations. (Contains 063 citations.)

PB80-853666 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Fibers. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 162p
NERACUSGNT0505
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover residual monomers in acrylic and modacrylic fibers and fabrics, cyclone dust analyzers, USPHS or NIOSH membrane filter method, bioassays for possible carcinogenicity, activated carbon fibers, and small fiber inhalation. Preliminary studies of asbestiform fibers in domestic water supplies is also included in this bibliography. (Contains 122 citations.)

PB80-853674 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Fibers. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 199p
NERACEDBNT0505
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover cellular reactions of particulate fibrous environmental pollutants, toxicity of insulating materials, industrial hygiene monitoring, radiation therapy, postirradiation fibro-sarcoma, and DNA repair processes. Preliminary results in the radiotherapeutic management of advanced cancers is also included in this bibliography. (Contains 180 citations.)

PB80-857162 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Cobalt. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Thomas H. Jones. Jun 80, 48p
NERACUSGNT0412
Sponsored in part by National Technical Information Service, Springfield, VA.

These reports cover the toxicity, carcinogenicity, environmental pollution, and other adverse effects of cobalt. The detection, analytical methods, standards, and removal from the environment are reported. These aspects of cobalt are dealt with in relation to aquatic and terrestrial flora and fauna including humans, and in such areas as the effluent from coal-fired power plants. (Contains 032 citations.)

PB80-857170 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Cobalt. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Thomas H. Jones. Jun 80, 74p
NERACEDBNT0412
Sponsored in part by National Technical Information Service, Springfield, VA.

These reports cover the toxicity, carcinogenicity, environmental pollution, and other adverse effects of cobalt. The detection, analytical methods, standards, and removal from the environment are reported. These aspects of cobalt are dealt with in relation to aquatic and terrestrial flora and fauna including humans, and in such areas as the effluent from coal-fired power plants. (Contains 045 citations.)

PB80-859424 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Toxicity of Transition Metals and Transition Metal Compounds. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 90p NERACEI NT0468
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports covering the toxicity, safety, health hazard and industrial hygiene of transition metals and their compounds. Included are effects on living organisms such as humans, fish and marine life, plants and animals. (Contains 092 citations.)

UCRL-84557 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Comparative Mammalian Genetic Toxicology of Shale Oil Products Assayed in Vitro and in Vivo.
H. Timourian, A. Carrano, J. Carver, J. S. Felton, and F. T. Hatch. 17 Jul 80, 25p CONF-800680-3
Contract W-7405-ENG-48
Symposium on health effects investigations of oil shale development, Gatlinburg, TN, USA, 23 Jun 1980.

The objective of this project is to determine the relative toxicity and mutagenicity (genetic toxicity) of crude and hydrotreated shale oil products from the Paraho surface retort. This was achieved by applying a battery of bioassays emphasizing mammalian systems and having both in vitro (cell culture supplemented with microsomes to allow metabolic activation) and short-term in vivo components. The results may be compared with the results from bioassays conducted in other laboratories to obtain a basis to estimate health hazards to humans. (ERA citation 05:030225)

7.

CHEMISTRY

7A. Chemical Engineering

ANL-FE-49627 PC **A02**/MF **A01**
Argonne National Lab., IL.
Workshop Consensus Statement from the 1980 Workshop on Instrumentation and Control for Fossil Energy Processes, January 28-29, 1980, New Orleans, Louisiana.
May 80, 24p ANL-FE-49627-TM01
Contract W-31-109-ENG-38

A workshop on Instrumentation and Controls (I and C) in Fossil Energy Processes was sponsored by the Department of Energy, Fossil Energy in New Orleans, Louisiana, January 28 to 29, 1980. The 82 participants included (approximately): 20% from energy firms (industrial partners), 34% from instrument manufacturers, 12% from architect-engineer and process design firms, 25% from institutions (EPRI, ANL, JPL, etc.), universities and technical societies, and 9% from government. Three major areas of consensus emerged: (1) technical needs, (2) barriers, and (3) communications. Instruments are needed to measure mass flow (solids/gas, solids/liquid), level, high temperature, viscosity, etc. Some needed instruments are unavailable commercially; some have small market, high development cost and risk; operating conditions are generally hostile due to high pressure and temperature, erosion, corrosion, etc. Barriers to I and C technology transfer involve: corporate policy (need to retain patent rights, trade secrets); fear of prosecution by governmental regulatory agencies (Justice, FTC, EPA, etc.) for alleged collusion, restraint of trade, etc.; and fear that candid discussion of I and C problems and deficiencies in plants will lead to loss of funding or job. An ad hoc organization is needed to vigorously pursue communication on I and C between industry and government representatives; and to identify and prioritize I and C needs. (ERA citation 05:030065)

BHO-TR-80-1 PC **A04**/MF **A01**
Department of Energy, Upton, NY. Brookhaven Area Office.
Chemical/Hydrogen Energy Systems Program. Annual Report.
D. S. Miller. 1 Jun 80, 64p

The currently funded tasks administered by the Brookhaven Area Office are: hydrogen production; materials; and program support. Highlights in the hydrogen production area are: General Atomic constructed and operated a closed loop cycle demonstrator in early CY 79. This system was operated on total recycle for a time equivalent to five turnovers of the original iodine inventory. General Atomic has incorporated into their process design a number of changes which has led to an improved theoretical efficiency of 47%. Westinghouse Electric Corporation constructed and operated a laboratory model which successfully demonstrated closed cycle operation of their proposed hybrid cycle. Westinghouse published an interim report of their electrolyzer development work entitled, Investigations on Electrode Kinetics and Electrocatalysts for Sulfur Dioxide Depolarized Electrolyzers. Los Alamos Scientific Laboratory has built a laboratory scale rotary kiln and has begun studying solids decomposition at temperatures in the range of 1000-1100K. In the materials area highlights are: Lawrence Livermore has identified CrSi sub 2 coated Incaloy 800 as a very promising candidate for use in constructing the high temperature sulfuric acid vaporizer required by both General Atomic and Westinghouse. Sandia was able to demonstrate that gaseous hydrogen can be transported through the natural gas pipeline network if reasonable precautions regarding pressure are observed. IGT demonstrated that, except for meters and cer-

tain lubricants, existing distribution equipment could be used for hydrogen service for a short (to be determined) period of time. Much more testing is required to evaluate performance for long-term use. (ERA citation 05:030350)

BMFT-FB-T-80-030 PC **A03**/MF **A01**
Rheinische Braunkohlenwerke A.G., Cologne (Germany, F.R.). Abt. Forchung und Entwicklung.
Report on the Engineering of the Pilot Plant for Hydrogasification of Coal in Framework of the PNP-Project. Final Report.
W. Ruddeck, and H. Langer. Jun 80, 45p
In German.
U.S. Sales Only.

Coal gasification processes have been known and well-tested for a long time. A number of further developments are being worked out; the main targets are to increase the gasification pressure and to save feed coal. Saving of feed coal is guaranteed in an optimum way by the processes which are developed within the framework of the project Prototype Plant Nuclear Process Heat (PNP). The use of nuclear process heat makes it possible to save up to 40% of the coal needed in conventional processes. Further advantages involved in this process are the increase in efficiency, reduction in emissions specific to coal and expected improvements of economy. One of these processes is the hydrogasification of coal (in a fluidized bed) which represents a key technology for producing synthetic natural gas (SNG). Hydrogasification of coal can be operated on either a conventional or nuclear basis. The first steps in developing this process were planning, construction, and operation of a semi-technical test plant with a design capacity of 100 kilograms C/h. So far, more than 700 metric tons of dry lignite and hard coal have been gasified in this test plant during an operation period of more than 4500 h. The promising results formed the basis for planning a pilot plant which is the last step before the implementation on a large technical scale. Basic engineering for this pilot plant was completed in mid-78 and was described in the research report ET 1023 A. This report deals with the work continued on detailed engineering for the period from mid to late 1978. The pilot plant is scheduled to be completed in late 1981. (ERA citation 05:028266)

CONF-7811168- PC **A04**/MF **A01**
Department of Energy, Washington, DC.
Report of a Contractor Meeting-Workshop: Review and Development of Biotesting Programs for Energy Utilization.
G. E. Stapleton, and P. Ts'o. Jul 80, 69p
Workshop on review and development of biotesting programs for energy utilization, Boca Raton, FL, USA, 11 Nov 1978.

Periodic program reviews are needed to establish the current state-of-knowledge resulting from research efforts and to reevaluate information needs based on recent progress. On November 11 to 14, 1978 such a review was convened in Boca Raton, Florida to evaluate a major segment of the EV-OHER program devoted to Short-Term Biological Characterization of Potentially hazardous Chemical Agents in Complex Materials Used or Produced in Non-Nuclear Energy Technologies. The sessions for in-depth discussions included: chemicals separation and analysis; new biotesting methods under development; and development of a human risk assessment system. (ERA citation 05:030140)

CONF-800391-1 PC **A02**/MF **A01**
Argonne National Lab., IL.
Thermochemistry of High-Temperature Corrosion.
K. Natesan. 1980, 14p
Contract W-31-109-ENG-38
Environmental degradation of high-temperature materials conference, Isle of Man, UK, 31 Mar 1980.

Multicomponent gas environments are prevalent in a number of energy systems, especially in those that utilize fossil fuels. The gas environments in these processes contain sulfur-bearing components in addition to oxidants. These complex environments, coupled with the elevated temperatures present in these systems, generally cause significant corrosion of engineering materials. Thermodynamic aspects of high-temperature corrosion processes occuring in complex gas mixtures are discussed, with emphasis on the role of thermochemical diagrams. The interrelationships between the corrosion behavior of materials and gas composition, alloy chemistry, and temperatures are examined. A number of examples from studies on materials behavior in coal-gasification environments are used to elucidate the role of thermochemistry in the understanding of corrosion processes that occur in complex gas mixtures. 11 figures. (ERA citation 05:030066)

DOE/ER/04463-T1 PC **A03**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Chemical Engineering.
Kinetic and Infrared Study of the Effect of Metal Crystallite Size and Metal-Support Interactions on CO Hydrogenation Reactions: A Third-Year Progress Report.
M. A. Vannice. 1980, 26p
Contract AS02-77ER04463

Platinum and palladium supported on four different oxide materials - SiO sub 2 , Al sub 2 O sub 3 , SiO sub 2 -Al sub 2 O sub 3 , and TiO sub 2 - have been studied in depth. Different preparative techniques were utilized to vary metal particle size and change the state of the metal. For example, Pt and Pd deposited on TiO sub 2 and reduced at low temperatures (175 to 200 exp 0 C) exhibit normal adsorption behavior, whereas these same catalysts reduced at a high temperature (500 exp 0 C) transform into an SMSI (Strong Metal-Support Interactions) state and chemisorption becomes greatly reduced. Both fresh and used samples were characterized by H sub 2 , and CO chemisorption. In addition, O sub 2 chemisorption and the H sub 2 -O sub 2 titration reaction were conducted on most fresh reduced Pt and Pd catalysts to further characterize their adsorption properties and to determine the agreement among these various chemisorption techniques. X-ray line broadening measurements were than conducted on all catalyst samples, and TEM was used to further characterize selected samples, especially the Ni catalysts. Metal loadings were determined by Neutron Activation Analysis. Tables 1 and 2 provide the chemisorption data on Pt and Pd catalysts respectively, and Tables 3 and 4 show the turnover frequencies (N) measured on Pt and Pd dispersed on various supports. (ERA citation 05:030067)

DOE/ER/10488-1 PC **A04**/MF **A01**
Pennsylvania State Univ., University Park.
Gasification of Disordered Carbons (Chars). Annual Progress Report for Period August 1, 1979-October 31, 1980.
P. L. Walker, Jr., and R. G. Jenkins. Jun 80, 72p
Contract AC02-79ER10488

It has been shown that rates of gasification of chars derived from coals vary widely with the rank of coal and the gasification medium used. Variation in rates is thought to be attributable to: (i) variation in active surface area and (ii) extent to which gasification is catalyzed by inorganic impurities present. It is the main objective of this research to confirm this hypothesis for carbons of different morphologies, including disordered carbons (chars). Initially studies are being performed on the carbon-oxygen reaction. This report covers progress in research in three areas: (i) measurement of rate constants for the adsorption step in the reaction of O sub 2 with a high purity char at low pressures, (ii) design and construction of a high pressure reactor to be used to measure rate constants for the desorption step in the reaction of O sub 2 with carbons, and (iii) development of small angle x-ray scattering (SAXS) to characterize both dispersion of catalysts supported on carbon and the micropore system of chars. (ERA citation 05:030068)

DOE/ET/13402-T1(V.1)
PC **A13**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant, Baskett, Kentucky: Environmental Report.
287p
Contract AC02-77ET13402

A summary of the potential environmental impacts of the construction and operation of the proposed plant is presented. The construction and operation of the plant are discussed in detail. (ERA citation 05:030110)

DOE/ET/13402-T1(V.2)
PC **A99**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant, Baskett, Kentucky: Environmental Report.
678p
Contract AC02-77ET13402

This volume contains chapter 4 and Appendix 4A which include descriptions of use of adjacent land and water (within miles of the proposed site), baseline ecology, air quality, meteorology, noise, hydrology, water quality, geology, soils and socio-economic factors. Appendix 4A includes detailed ecological surveys made in the area including the methods used. (ERA citation 05:030111)

DOE/ET/13402-T1(V.3)
PC **A99**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant, Baskett, Kentucky: Environmental Report.
1078p
Contract AC02-77ET13402

This appendix contains certain data gathered by Ebasco Services Incorporated/Envirosphere during the field studies relative to the Baskett Site. Included in this appendix are the data collected by Envirosphere Aquatic Ecologists during a baseline study of on-site water bodies and the Green River adjacent to and up-river from the site. The on-site bodies, including a stream, three farm ponds, and Cypress Slough were sampled to gather necessary information to describe the population and community structure of the aquatic systems. The data were also used in part as a basis for determining potential impact on the systems affected by construction and operation of the Synthesis Gas Demonstration Project. Also included are data from a quarterly surface water and groundwater quality monitoring program. The data include field sampling and laboratory analyses undertaken to establish seasonal water quality for the period of Fall 1978 through Summer 1979. A field sampling program was conducted to gather hydrological data of in-situ temperature measurement, vertical profiles of current speed, current direction and temperature at specified depths of near bottom, mid-depth and near surface, and detailed bathymetry of the Green River in an area 1500 ft upstream and downstream of the discharge location. Also presented are data gathered by the Ebasco Consulting Civil Department on the Geology, Soils, and Geohydrology of the site area. Air quality/meteorological monitoring data includes carbon monoxide, sulfur dioxide, nitrogen dioxide, ammonia, ozone, wind speed, wind direction, total suspended particulates, total organic and inorganic fractions, total sulfates, trace elements, and polynuclear aromatic hydrocarbons. (ERA citation 05:030112)

DOE/ET/13402-T14 PC **A03**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Trade-off Studies Report V: Cooling Tower Optimization.
Dec 78, 40p
Contract AC02-77ET13402

The basic results of the economic investigation of rectangular mechanical draft cooling towers for the commercial plant application are tabulated. The results show that the annual costs, adjusted for the influence of cooled water temperature and cooling range on plant equipment costs and performance, follow a well defined pattern. Specifically, we find that for a given design cooled water temperature, costs are reduced when the cooling range (or temperature rise through the plant) is increased. The rate of cost reduction decreases however, indicating an eventual reversal of the trend caused by a rapid increase in the cost of plant equipment designed for high range and high temperatures. It is also noted that costs decrease as the design cooled water temperature approaches the design wet bulb temperature. This trend is due to the influence of plant costs since the trend in cooling tower costs is opposite. An optimum occurs at 83 exp 0 F cooled water temperature due to rapidly increasing cooling tower costs. The plotted results show that for all cooling ranges up to 35 exp 0 F, a cooled water temperature of 83 exp 0 F is the economic choice. This is also the lowest practical choice for cooling tower design. To allow for the specification

of plant equipment to accept a cooled water temperature in excess of 83 exp 0 F, and to allow for some deterioration in tower performance without exceeding 120 exp 0 F hot water temperature, it is recommended that a range of 30 exp 0 F be used. Summarizing, it is recommended that the cooling tower be of the conventional rectangular mechanical design and based upon a cooled water temperature of 83 exp 0 F and a cooling range not to exceed 30 exp 0 F. (ERA citation 05:030077)

DOE/ET/13402-T15 PC **A03**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Deliverable No. 7-B. Critical Specifications and Parameters for the Detailed Design and Construction of the Demonstration Plant.
Oct 79, 40p
Contract AC02-77ET13402

Paragraph 10, Article (4) I, Technical Direction and Contract Administration of Prime Contract No. ET-77-C-01-2577 states as follows: prior to any mutual determination to proceed to Phase II in accordance with Article (1) VIII above, the Government and the Industrial Partner shall agree to certain critical specifications and parameters to be used in the detailed design and construction of the Demonstration Plant, including, inter alia, the size and materials for major pieces of equipment. Such agreement shall be set forth in writing and shall be signed by the Industrial Partner's Project Director and by the Government's Program Director and Contracting Officer. This document has been prepared to delineate and define the critical specifications and parameters to be used in the detailed design and construction of the Demonstration Plant in accordance with the above and includes the following: major design parameters, design codes and standards, general specifications, specifications of major equipment items, process schematics, flow diagrams, and plot plans and elevations. (ERA citation 05:030078)

DOE/ET/13402-T16 PC **A05**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Trade-off Studies Report IV, Air Quality Control Alternatives.
Sep 78, 85p
Contract AC02-77ET13402

For particulate removal systems four alternate methods were considered: wet venturi scrubbers, combination of multicyclonic mechanical dust collectors (MDC) and wet venturi scrubbers; electrostatic precipitators (ESP), and baghouses. For sulfur dioxide (SO sub 2) removal eleven alternate systems were considered: magnesia slurry scrubbing, sodium sulfite scrubbing (Wellman-Lord), ammonia (clear liquor), citrate, phosphate (Aqua-Claus), steam stripping, aqueous carbonate, ammonia (semi-dry), carbon sorption, copper oxide, and catalytic oxidation. On the basis of this investigation it is recommended that a 99.65 percent efficiency ESP/Wellman-Lord System be utilized for this project. The technical and economic bases for this recommendation are given. (ERA citation 05:030079)

DOE/ET/13402-T2 PC **A23**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Site Confirmation Report.
Dec 78, 540p
Contract AC02-77ET13402

With few reservations, the Baskett, Kentucky site exhibits the necessary characteristics to suggest compatibility with the proposed Synthesis Gas Demonstration Plant Project. An evaluation of a broad range of technical disciplinary criteria in consideration of presently available information indicated generally favorable conditions or, at least, conditions which could be feasibly accommodated in project design. The proximity of the Baskett site to market areas and sources of raw materials as well as a variety of transportation facilities suggests an overall favorable impact on Project economic feasibility. Two aspects of environmental engineering, however, have been identified as areas where the completion or continuation of current studies are required before removing all conditions on site suitability. The first aspect involves the current contradictory status of existing land use and planning ordinances in the site area. Additional investigation of the legality of, and local attitudes toward, these present plans is warranted. Secondly, terrestrial and aquatic surveys of plant and animal life species in the site area must be completed on a seasonal basis to confirm the preliminary conclusion that no exclusionary conditions exist. (ERA citation 05:030070)

DOE/ET/13402-T21(V.3A) PC **A11**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Commercial Plant Conceptual Design and Evaluation.
Mar 79, 248p
Contract AC02-77ET13402

Volume 3A contains specifications for the following plant areas: coal handling (unloading and reclaiming), coal slurry preparation, CO shift process, ammonia synthesis, sulfur recovery, steam generation, steam distribution, feedwater and condensate systems, air quality control and ash handling. The following areas contain proprietary information and are not included: coal gasification, carbon/ash separation, acid gas removal, nitrogen wash, and air separation. (ERA citation 05:030082)

DOE/ET/13402-T21(V.3B) PC **A12**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Commercial Plant Conceptual Design and Evaluation.
Mar 79, 259p
Contract AC02-77ET13402

No abstract available.

DOE/ET/13402-T21(V.4A) PC **A13**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Commercial Plant Conceptual Design and Evaluation.
Mar 79, 285p
Contract AC02-77ET13402

This volume contains the trade-off study optimizing operating pressure (1200 psig was chosen), gas purification alternatives (Rectisol and Selexol processes were chosen). Coal preparation (wet grinding in a rod mill with trommel screen removal of oversize was recommended), air quality control (a 99.65% efficiency electrostatic precipitator and Wellman-Lord sulfur dioxide removal process were recommended), and for cooling tower optimization, a cooled water temperature of 83 exp 0 F was the optimum economic choice, with a hot water entering temperature of 118 exp 0 F. (ERA citation 05:030084)

DOE/ET/13402-T21(V.4B) PC **A13**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Commercial Plant Conceptual Design and Evaluation.
Mar 79, 289p
Contract AC02-77ET13402

This portion of the trade-off study covers the findings and conclusions regarding alternative marketing, technical, and economic advantages of producing elemental sulfur or sulfuric acid from the assumed plant at Baskett, Kentucky. The Combination Plant, which consists of a Claus unit and a single absorption sulfuric acid unit, is recommended for the Commercial Plant for reasons given in the text. The Combination Plant is also recommended for the Demonstration Plant. In this case, the Return on Investment is slightly lower than for the Single Acid Plant; however, the Combination Plant has a lower operating cost per ton, and the same technical advantages outlined above for the Commercial Plant. It is recommended that further work on CO sub 2 sales analysis be postponed until a start-up date for the proposed plant has been established. Periodic contact should be maintained with those companies which have indicated potential interest in purchasing CO sub 2 from the proposed plant. This will allow more quantitative analyses of market demand before a decision is made to sell raw gas, build a purification facility, or vent the gas. It is recommended that no further work be done on the ash and slag sales analysis until the ash and slag have been sufficiently characterized. At this point, a decision can be made to further investigate whether market demands justify incorporating load-out facilities into the plant design. Due to the specialized nature of ash/slag marketing, it may be appropriate to obtain the services of an ash/slag marketing organization. (ERA citation 05:030085)

DOE/ET/13402-T22 PC **A02**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Pilot Plant Test Plan.
Jan 79, 23p
Contract AC02-77ET13402

Section I in Appendix A to Subcontract No. 3 between Ebasco Services Inc. and Texaco Inc. for the Synthesis Gas Demonstration Plant Program provides for pilot plant testing to be performed at Texaco's Montebello Research Laboratory. The Type Ia test consists of laboratory scale screening analyses not considered further here. The Type Ib and Type Ic tests are pilot plant evaluations which are outlined in detail in this document. Each Type Ib test consists of one or two short pilot plant runs during which approximately 6 tons of coal will be gasified at 1200 psig. The object of this test is to confirm the operability of the process with the selected coal, refine the estimates of preferred operating conditions, product gas yield and composition, obtain slag and char properties and establish the basis for a sustained run with the selected coal. Unexpected operating problems will be identified. The Type Ic test will consist of a sustained 14 to 30 day gasification of the design coal at 1200 psig. The object of this test is to establish equilibrium conditions in all streams, obtain analytical data from all streams, obtain slag and char physical properties, demonstrate sustained operation with the design coal and confirm the design basis. (ERA citation 05:030086)

DOE/ET/13402-T23 PC **A04**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Trade-off Studies Report No. 1: Gasifier Operating Pressure.
May 78, 58p
Contract AC02-77ET13402

The conclusions from analysis of the capital cost estimate is that the comparative figures show a minimum cost at about 1200 psig, which is well within the 500 to 1500 psig pressure range where the absolute cost data is of good accuracy. With the use of figures, the trends apparent are presented graphically, while the breakdown of energy consumption, which is responsible for the major portion of operating costs, can be seen. Inspection of the figures shows that total operating cost is at a minimum at 1200 psig gasification pressure, with the values at 500 and 2500 psig being each about 5 to 6% higher than this minimum. As the individual curves for total operating costs and for capital charges each show the same shape, the combination of these two parameters further emphasizes the trend for minimum ammonia production cost to correspond with the 1200 psig gasification pressure case. Production cost is about 9.5% higher than the minimum at 500 psig and about 13.6% higher at 2500 psig. (ERA citation 05:030087)

DOE/ET/13402-T24 PC **A02**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Deliverable No. 42. Technical Support Report.
Sep 79, 22p
Contract AC02-77ET13402

The Demonstration Plant Process and Conceptual Mechanical Design was prepared by Ebasco Services in conjunction with its key subcontractors, Humphreys and Glasgow (H and G) as process subcontractor and Texaco as supplier of the gasification technology. In addition, vendor assistance was obtained in specialized areas such as: the Acid Gas Removal and Nitrogen Wash Systems, the Air Separation System, the Sulfuric Acid Plant and SO sub 2 Removal from Boiler Flue Gas. This report identifies the technical support provided by

H and G, Texaco and the process vendors of specialized systems as outlined in Deliverable No. 41, Technical Support Plan. The findings, conclusions and recommendations, in general, form the basis for the design of the Demonstration Plant. However, in the finalization of the Demonstration Plant Process and Conceptual Mechanical Design, modifications required as a result of the development of additional information were incorporated. The major thrust of the modifications were to increase plant reliability and assure that environmental requirements would be met for all expected modes of plant operation. (ERA citation 05:030088)

DOE/ET/13402-T25 PC **A04**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Trade-off Study Report II: Gas Purification Alternatives.
Feb 79, 62p
Contract AC02-77ET13402

Gas purification must be carried out in two stages for economic and technical reasons. The requirements of the first stage can be met by a Rectisol plant by Lotepro/Linde AG, or by a Selexol unit by Air Products/Allied Chemical. The second stage in either case should be a Nitrogen Wash unit. The Rectisol solvent (methanol) is freely available worldwide. Selexol solvent is obtainable only from single sources in the USA and in Germany, but serious supply problems are not anticipated. Selexol solvent is relatively non-toxic, non-volatile and non-flammable. Although methanol is classified as toxic and flammable, these potential hazards are controlled to acceptable levels of safety by application of standard methods for plant design and operational handling. The alternative gas purification systems have almost identical installed plant cost, but the operating cost of the Selexol system is substantially higher than that for the Rectisol version. This difference is large compared to any advantages of the Selexol process enumerated above. It is recommended that the Rectisol plant offered by Lotepro/Linde AG, plus a Nitrogen Wash unit, should be specified for the Commercial and Demonstration Plant. Before any such plant is ordered the process requirements (particularly concerning effluents) should be defined as exactly as possible. (ERA citation 05:030089)

DOE/ET/13402-T26 PC **A03**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Deliverable No. 28: Plans for Use and Disposition of Products.
Sep 79, 45p
Contract AC02-77ET13402

As part of Phase I of the Synthesis Gas Demonstration Plant Program, plans for marketing all usable products and by-products from the Demonstration Plant and for disposing of all nonusable by-products and waste streams are to be developed. This plan has been prepared to identify the means of disposition of products, by-products and waste streams. The Demonstration Plant has been designed to produce a synthesis gas suitable for use in the production of ammonia. The plant also produces sulfur, sulfuric acid, carbon dioxide, fly ash, bottom ash, and slag. These by-products are discussed in this plan. In addition, all waste streams are identified and the means of disposal discussed. (ERA citation 05:030090)

DOE/ET/13402-T28 PC **A11**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Trade-off Study VI, by-Product Sales Analysis. Part 1. Sulfur Recovery System. Part 2. Carbon Dioxide, Fly Ash, Bottom Ash and Slag.
Mar 79, 245p
Contract AC02-77ET13402

The objectives of this study were to develop and analyze information to facilitate decision making in regard to by-products from the Commercial Plant. Part 1 of the study investigated the alternative marketing and commercial advantages of producing elemental sulfur or sulfuric acid, the findings to be used with results of a technical and economic analysis to determine the relative desirability of choosing either as a by-product. The principal commercial and marketing input for this portion of the study were provided by review of authoritative published material and by personnel interviews with government, trade association and commercial information sources, including a limited number of major consumers and producers. Compilation and analysis of statistical data and knowledgeable opinions on the following were included: production and consumption trends and future outlook; levels of current and expected future prices; end-use trends and outlook for new uses; geographic consumption patterns; export market and outlook for foreign sales; and other factors related to the present and future supply and demand and effective marketing of the by-products. Technical data were obtained from the commercial suppliers of the processes involved, supplemented by information from producers of the by-products under consideration. The predicted composition and quantity of all gaseous waste streams were used for investigation of by-product potential. Capital investment and operating costs to produce the saleable by-products investigated were developed for each production alternative considered. Operating profits were determined and comparative figures were calculated for net cash flow and return on investment. (ERA citation 05:030092)

DOE/ET/13402-T4 PC **A03**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Trade-off Study Plan.
9 Nov 77, 31p
Contract AC02-77ET13402

This report consists of detailed plans for trade-off studies as follows: gasifier operating pressure, method of coal preparation, air quality control alternatives, and cooling tower optimization. (ERA citation 05:030071)

DOE/ET/13402-T5 PC **A03**/MF **A01**
Ebasco Services, Inc., New York.
Synthesis Gas Demonstration Plant Program, Phase I. Deliverable No. 26: Environmental Report Outline.
10 Jul 78, 32p
Contract AC02-77ET13402

No abstract available.

DOE/ET/13402-T6 PC **A05**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Deliverable No. 7D: Final Report on Pilot Plant Sustained Run.
28 Dec 79, 86p
Contract AC02-77ET13402

The object of the Type Ic, Extended Pilot Plant Run, was to establish equilibrium conditions in all streams, obtain analytical data from all streams, obtain slag and char physical properties, demonstrate sustained operation with the design coal and confirm the design basis. Based on our initial review of the data obtained from the extended run, the objectives of the run have been met. The extended run confirmed the design parameters used in the Demonstration Plant design with regard to Synthesis Gas composition and quantity, waste streams, and the required coal and oxygen inputs. The Texaco Type Ic Test Report included in this report tabulates this information. The design of the Demonstration Plant was essentially completed before the Type Ic extended test run. As stated, the extended test generally confirmed the validity of the Demonstration Plant design. However, certain factors emerged during the test run that suggest that certain aspects of the Demonstration Plant design should receive particular attention during Phase II of the Demonstration Plant Program. These are listed and described. (ERA citation 05:030072)

DOE/ET/13402-T7 PC **A02**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Deliverable No. 16. Recommendation and Rationale for Demonstration Plant.
Apr 79, 19p
Contract AC02-77ET13402

The conceptualized design for the Commercial Plant and the results of the economic and environmental evaluations are used as a basis for selecting the process configuration and size of the Demonstration Plant. The processing steps and size selected are those required to verify the technical and economic performance of the conceptualized Commercial Plant. The first part of this section addresses the subject of Demonstration Plant size and the second part discusses the recommended configuration of the Demonstration Plant and reviews the process and/or equipment selection in various parts of the overall process. (ERA citation 05:030073)

DOE/ET/13402-T8 PC **A03**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Trade-off Study Report III, Method of Coal Preparation.
Apr 79, 49p
Contract AC02-77ET13402

It is recommended that the design of the Coal Handling System for the Demonstration Plant be based on using equipment similar to, but at one-third of the size of equipment specified for the Commercial Plant. The one major exception to this recommendation involves the barge unloader where it is recommended that for the Demonstration Plant a single grab bucket be used rather than the twin bucket ladder specified for the Commercial Plant. Wet grinding of coal in a rod mill operated in open circuit, using a trommel screen for removal of oversize material is recommended for the conceptual design of the Commercial Plant for the reasons given. The impact of oversized product material on the performance of downstream equipment, and in particular on the ability of the slurry pumps to deliver a consistent volume of slurry has been considered for this study, but its effect has not yet been demonstrated in tests. Conflicting opinions have been expressed by slurry pump vendors as to the maximum slurry top size which can be handled without causing flow interruptions. In consideration of the severe consequence which will occur in downstream processing equipment if the slurry flow is suddenly interrupted, it is recommended that the Demonstration Plant design be based on a system which will more positively eliminate the possibility of oversize material reaching the slurry pumps. The use of an open circuit system involving rod mill grinding, vibrating screening for separation and recycling of 14 plus US mesh material, followed by dewatering facilities should be considered. (ERA citation 05:030075)

DOE/ET/13402-T9 PC **A03**/MF **A01**
Grace (W.R.) and Co., Memphis, TN.
Synthesis Gas Demonstration Plant Program, Phase I. Deliverable No. 7F: Phases II and III Environmental Monitoring Plans.
Jan 80, 37p
Contract AC02-77ET13402

The baseline monitoring program established existing conditions at the site from which construction and operational impacts were predicted in the Environmental Report. The purpose of construction and operational programs is to identify and quantify impacts and monitor the effectiveness of selected mitigation measures. The construction and operational programs are a refinement of the baseline monitoring program. The goal is to avoid redundance by monitoring specific activities and areas where impacts could occcur. This includes utilizing data required for permit compliance (air and water discharges and solid waste disposal). A review of the baseline monitoring program was also conducted to determine if data gaps or voids existed in the baseline program which could be filled with a preconstruction monitoring program. The review was conducted in light of the potential impacts from construction and operational activities identified in the Environmental Report. Review of the baseline monitoring program and the Environmental Report indicated the need for some additional data. Therefore, a preconstruction monitoring program has been designed to fill in the data gaps and strengthen the data base for subsequent impact and mitigative measure assessments. (ERA citation 05:030076)

DOE/ET/14800-10 PC **A03**/MF **A01**
Pittsburg and Midway Coal Mining Co., Shawnee Mission, KS.

Exploratory Research on Solvent Refined Coal Liquefaction. Quarterly Technical Progress Report, April 1-June 30, 1979.
Jul 80, 41p
Contract AC01-79ET14800

This report summarizes the progress of the Exploratory Research on Solvent Refined Coal Liquefaction project by The Pittsburgh and Midway Coal Mining Company's Merriam Laboratory for the period April 1, 1979 through June 30, 1979. Experimental work included a number of short residence time runs, but discussion of that work has been delayed until a later report. Experimental work reported focuses on an investigation of the decline in solvent quality experienced by the Wilsonville Pilot Plant during runs in support of the SRC I Demonstration Plant. A four run series was initiated with Wilsonville solvent; both the coal used at Wilsonville (Kentucky 6/11 - Pyro Mine) and Kentucky 9/14 coal from the Colonial Mine were used. The effect of pyrite addition to the Pyro Mine coal was investigated. No solvent quality or coking problems were experienced in the Merriam runs. Significant changes in solvent composition were apparent and equilibrated solvent samples were returned to Wilsonville for solvent quality testing. (ERA citation 05:030113)

DOE/ET/14800-11 PC **A04**/MF **A01**
Pittsburg and Midway Coal Mining Co., Shawnee Mission, KS.
Exploratory Research on Solvent Refined Coal Liquefaction. Quarterly Technical Progress Report, July 1, 1979-September 30, 1979.
Jul 80, 56p
Contract AC01-79ET14800

This report summarizes the progress of the Exploratory Research on Solvent Refined Coal Liquefaction project by The Pittsburgh and Midway Coal Mining Co.'s Merriam Laboratory for the period July 1, 1979 through September 30, 1979. In a series of experiments with varying feed gas composition, high levels (20 to 40 mol %) of carbon monoxide resulted in a general degradation of operability and reduced oil yields from Powhatan coal (Pittsburgh Seam). Addition of finely divided pyrite to the reactive Powhatan coal had little effect on oil yields although the molecular weight of the distillation residue was apparently decreased. When finely divided pyrite and magnetite were added to the less reactive Loveridge coal (also Pittsburgh Seam), however, a substantial increase in oil yields and product quality was obtained. (ERA citation 05:030114)

DOE/FE-0002/79/2 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Div. of Coal Conversion.
Coal Gasification. Quarterly Report, April-June 1979.
Apr 80, 69p

In DOE's program for the conversion of coal to gaseous fuels both high-and low-Btu gasification processes are being developed. High-Btu gas can be distributed economically to consumers in the same pipeline systems now used to carry natural gas. Low-Btu gas, the cheapest of the gaseous fuels produced from coal, can be used economically only on site, either for electric power generation or by industrial and petrochemical plants. High-Btu natural gas has a heating value of 950 to 1000 Btu per standard cubic foot, is composed essentially of methane, and contains virtually no sulfur, carbon monoxide, or free hydrogen. The conversion of coal to High-Btu gas requires a chemical and physical transformation of solid coal. Coals have widely differing chemical and physical properties, depending on where they are mined, and are difficult to process. Therefore, to develop the most suitable techniques for gasifying coal, DOE, together with the American Gas Association (AGA), is sponsoring the development of several advanced conversion processes. Although the basic coal-gasification chemical reactions are the same for each process, each of the processes under development have unique characteristics. A number of the processes for converting coal to high-Btu gas have reached the pilot plant Low-Btu gas, with a heating value of up to 350 Btu per standard cubic foot, is an economical fuel for industrial use as well as for power generation in combined gas-steam turbine power cycles. Because different low-Btu gasification processes are optimum for converting different types of coal, and because of the need to provide commercially acceptable processes at the earliest possible date, DOE is sponsoring the concurrent development of several basic types of gasifiers (fixed-bed, fluidized-bed, and entrained-flow). (ERA citation 05:030093)

DOE/PC/30141-T1 PC **A03**/MF **A01**
TRW, Inc., Redondo Beach, CA.
Laboratory Study for Removal of Organic Sulfur from Coal. Quarterly Technical Progress Report.
Jul 80, 26p
Contract AC22-80PC30141

Substantial progress has been made in the development of the Gravimelt Process for removal of organic sulfur from coal. Three reactors have been fabricated for both material balance studies of the desulfurization of coal with caustic and examination of the behavior of model organic and inorganic sulfur-containing compounds with the same mixture. Model organic sulfur conpounds have been procured and samples of Kentucky No. 9 coal enriched in mineral matter and samples enriched in organic matter have been prepared by float sink techniques for use in determining mechanism and products of the desulfurization reactions. Initial experimentation has been aimed at determining the fate of sulfur removed from coal and obtaining semi-quantitative information for future material balance studies. These studies show near 90% of the sulfur content of the Kentucky No. 9 coal was removed and approximately 3/4 of this removed sulfur was found by chemical analysis to be in the caustic phase. It was further determined that approximately 1% of the coal organic matter dissolves into the caustic phase. These results indicate rough material flows and show that material balance measurements are feasible. A preliminary conceptual engineering design for a full scale Gravimelt coal desulfurization plant was prepared in order to guide future laboratory efforts toward obtaining key engineering data. The engineering study indicates that the Gravimelt Process can be designed utilizing state of the art equipment and that likely energy recovery is approximately 90%. It is estimated that coal desulfurization costs will be in the range of $20 per ton of coal produced, or $.70/10 exp 6 Btu, in 1980 dollars. (ERA citation 05:030051)

DOE/PETC/TR-80/6 PC **A06**/MF **A01**
Department of Energy, Pittsburgh, PA. Pittsburgh Energy Technology Center.
Air/Water Oxydesulfurization of Coal: Laboratory Investigation.
R. P. Warzinski, S. Friedman, J. A. Ruether, and R. B. LaCount. Aug 80, 117p

Air/water oxidative desulfurization has been demonstrated in autoclave experiments at the Pittsburgh Energy Technology Center for various coals representative of the major US coal basins. This experimentation has shown that the reaction proceeds effectively for pulverized coals at temperatures of 150 to 200 exp 0 C with air at a total system pressure of 500 to 1500 psig. Above 200 exp 0 C, the loss of coal and product heating value increases due to oxidative consumption of carbon and hydrogen. The pyritic sulfur solubilization reactions are typically complete (95 percent removal) within 15 to 40 minutes at temperature; however, significant apparent organic sulfur removal requires residence times of up to 60 minutes at the higher temperatures. The principal products of the reaction are sulfuric acid, which can be neutralized with limestone, and iron oxide. Under certain conditions, especially for high pyritic sulfur coals, the precipitation of sulfur-containing compounds from the products of the pyrite reaction may cause anomalous variations in the sulfur form data. The influence of various parameters on the efficiency of sulfur removal from coal by air/water oxydesulfurization has been studied. (ERA citation 05:030052)

EPRI-AP-1361 PC **A05**/MF **A01**
Radian Corp., Pasadena, CA.
Logistics Management of Paraho Residual Shale Oil. Final Report.
G. A. Gunberger. Mar 80, 89p

In January of 1977 the Paraho Development Company under contract with the United States Navy began a semi-works project to produce and refine up to 100,000 barrels of crude shale oil. Although the primary objective of the project was to produce specification turbine and diesel transportation fuels for field testing by the military field testing, the full-scale refinery run also produced a substantial quantity of hydrotreated shale oil residue. In 1978 the Electric Power Research Institute, recognizing the utilization potential of this material as a fuel for utility combustion turbines, obtained 4300 barrels of the residual shale oil product for future field testing. This report describes the processes involved in producing, handling, and storing the residual shale oil test material. The report also includes detailed chemical and physical analyses of the test material. In addition, guidelines which can be applied to future work with this type of synthetic fuel are included. (ERA citation 05:030220)

FE-1207-69(V.1) PC **A13**/MF **A01**
Bituminous Coal Research, Inc., Monroeville, PA.
Gas Generator Research and Development BI-GAS Process. Final Report, August 19, 1971-October 31, 1979.
Jun 80, 282p BCR-L-1037(V.1)
Contract AC01-76ET10312

For the past nine years, Bituminous Coal Research, Inc., under contract to the Office of Coal Research, has conducted research and development on systems for the generation of commercially important gases from coal. Major emphasis has been on the development of the conceptual two-stage super-pressure gasifier as evaluated in the Phase I survey and evaluation study for high-Btu pipeline gas production. Continued operation of the 100 lb/hr Stage 2 process and equipment development unit (PEDU) has supplied reliable information for further evaluation of the direct methanation process. Coals ranging in rank from lignite to high volatile A bituminous coal were tested in the PEDU under a wide range of conditions without pretreatment of the coal and without formation of tar in the process. Yields of methane directly from bituminous coal were higher than predicted from consideration of results obtained in previous tests in a smaller reactor. During this report period, effort was devoted to other unit operations; namely, catalytic methanation of the gases from the two-stage gasifier to produce a high-Btu pipeline-quality gas. Emphasis is being placad on the development of those systems not already available commercially and which are not being developed by others. Conventional methanation systems are generally based on nickel catalysts in fixed beds. Because of the severity of the operating conditions and the large amount of heat generated from the BI-GAS synthesis gas, BCR is developing a program based on a dry fluidized-bed methanator using several different types of catalysts. Data processing and data acquisition systems have been developed as a result of the experimental programs conducted. (ERA citation 05:030095)

FE-1207-69(V.2) PC **A22**/MF **A01**
Bituminous Coal Research, Inc., Monroeville, PA.
Gas Generator Research and Development BI-GAS Process. Final Report, August 19, 1971-October 31, 1979.
Jun 80, 501p BCR-L-1037(V.2)
Contract AC01-76ET10312

The BI-GAS Pilot Plant, located in Homer City, Pennsylvania, is a grass-roots facility designed to study a new process for the conversion of coal into pipeline quality gas. This is the first of a series of operating reports designed to describe the activities, present data and conclusions, and to make recommendations appropriate to that operation. This report focuses on the initial operation of the gasifier but also addresses some of the other major process units of the integrated pilot plant. Those areas include coal preparation and gas treating. Other areas which have not yet been addressed are methanation and sulfur recovery. A principal feature of the plant is the 2-stage, entrained-bed, high-pressure (1500 psig max), oxygen-blown, and ash-slagging gasifier unit. In the refractory-lined Stage II, coal is devolatilized by the hot Stage I effluent. Inside the water cooled barrel forming the reaction chamber of Stage I, the recycled char is combusted to form heat and hydrogen for the Stage II reactions, and the ash is

converted to a molten slag which exits through a tap hole into the quench section. Pilot plant test summaries are provided for the individual tests. (ERA citation 05:030097)

FE-2034-19 PC A03/MF A01
Montana State Univ., Bozeman.
Catalytic Hydrogenation of Coal-Derived Liquids. Interim Report, March 1980-May 1980.
L. Berg, and F. P. McCandless. Jun 80, 30p
Contract AC01-76ET10495

The work on the development of catalysts capable of converting solvent refined coal, SRC-II, into a feedstock suitable for a conventional petroleum refinery was continued. This requires a process which reduces the nitrogen content from the 1.17% in SRC-II to at least as low as 0.3%. A catalyst containing MoO sub 3 , CoO, NiO and WO sub 3 was evaluated, subjected to an air burnoff to remove the carbon laydown and re-evaluated. It gave acceptable denitrogenation and desulfurization. Two catalysts containing only MoO sub 3 and CoO were fabricated and evaluated both before and after burnoff with air. They did not perform well after burnoff. Two different base materials were evaluated with no metal loading. The base materials alone fail to give specification denitrogenation. A study of the fate of the nitrogen removed showed that most of it is in the carbon laydown, lesser amounts in the liquid product and the least in the offgases. Somewhat better operation takes place when the SRC-II feed is preheated to 100 to 200 exp 0 C. A commercial T.C.C. equilibrium petroleum cracking catalyst is not effective in the denitrogenation of SRC-II. (ERA citation 05:030118)

FE-2044-47 PC A02/MF A01
Rockwell International, Canoga Park, CA. Environmental and Energy Systems Div.
Partial Liquefaction of Coal by Direct Hydrogenation. Quarterly Progress Report, April-June 1979.
A. Y. Falk. 13 Jul 79, 22p
Contract EX-76-C-01-2044

Seven additional reactor tests were made in the 1 TPH PDU; two of these were approximately 1 hour in duration. Fourteen tests have now been made with the PDU since the installation of the high-pressure product recovery system was completed. Analysis of results from these tests indicates carbon conversion results consistent with the trends shown in the previous testing. The carbon balance for the first of the 1-hour tests was approx. 95%, with the unrecovered material assumed to be liquid products. Several operational and hardware problems were encountered which slowed the test frequency somewhat. However, all have been resolved with the exception of char coking or agglomeration which was experienced on Tests 12, 13, and 15. This is thought to be due to failure of some of the oxygen injection tubes in the preburner which could cause hot streaks (poor temperature uniformity) in the hydrogen injection. The new product recovery system appears to be functioning well and as designed. Fabrication of the heat recovery quench unit was completed. Subcontracts for construction of the BTX recovery system and the A-E process study were initiated. A char removal (blowdown) system has been installed on the 1 TPH PDU which, when fully developed, will permit tests to be conducted converting up to 3-1/2 tons of coal. (ERA citation 05:030060)

FE-2346-68 PC A02/MF A01
Michigan Technological Univ., Houghton. Dept. of Mining Engineering.
Fracture Toughness of Antrim Shale.
K. Kim, and A. Mubeen. May 80, 20p
Contract AC01-76ET12153

Fracture toughness of Antrim shale cores from Dow Chemical's Sanilac County test site in Michigan were measured by the burst test method developed by Clifton et al. (1976). These tests were conducted to establish a preliminary data base to be used for the designing of a bed preparation method and prediction of rock fracture behavior under various loading conditions such as explosives and hydraulic fracturing for in-situ processing of oil shale. The test method was chosen because the thick-walled cylinder provides a loading and specimen configuration similar to in-situ hydraulic fracturing operations and the specimens can be conveniently prepared from diamond drill cores for laboratory tests. Further, the nature of variation of crack tip stress intensity in this specimen is such that K/sub IC/ does not depend on initial crack length, and crack propagation need not be monitored. The test results show that the fracture toughness of typical Antrim shale core range from 930 to 1080 psi sqrt in. while the limestone specimens, a basement rock, range from 1240 to 1430 psi sqrt in. These values are close to that of lean Western oil shale from Anvil point, Colorado (Schmidt, 1977), i.e., 980 psi sqrt in. (ERA citation 05:030217)

FE-2855-T1 PC A05/MF A01
TRW Defense and Space Systems Group, Redondo Beach, CA. Chemistry and Chemical Engineering Lab.
Catalytic Conversion of Coal Energy to Hydrogen.
Mar 80, 84p
Contract ET-78-C-01-2855

An experimental and conceptual engineering analysis study has been performed to assess the potential of generating hydrogen by means of alkali catalyzed coal char-steam reactions. The experimental studies consisted of a fundamental catalyst research effort and a more process oriented investigation of catalyst performance. The fundamental studies were aimed at determining the nature of catalyst-fuel communication during gasification, the processes involved in catalyst deactivation, and the chemical mechanism of catalysis. The kinetics of fixed-bed conversion reactions were measured and the effects of several reaction parameters on the kinetics evaluated. On the basis of these measurements and the results of supporting studies, a major new step was taken in describing alkali catalyst behavior in catalytic char gasification. In the second part of the experimental studies, the performance of alkali catalysts in fluidized char gasification reactions was investigated. Information gained from these studies was used to develop and support a conceptual catalytic process design. In the engineering analysis studies, a conceptual design for a catalytic hydrogen process was developed and its economics analyzed and compared with other conversion processes. The hydrogen process design developed and assessed was for a catalytic version of the CO sub 2 - Acceptor process. Results obtained from the experimental and engineering analyses indicated, at the laboratory-scale and conceptual process engineering level of investigation, catalytic hydrogen production is feasible and may offer significant technical and economic advantages over other hydrogen generation and coal conversion processes. Further catalyst research and process development work appear warranted. (ERA citation 05:030352)

FE-3031-3 PC A03/MF A01
Carnegie-Mellon Inst. of Research, Pittsburgh, PA.
Design and Simulation of a Recirculating Bed Reactor for Coal Hydrogasification. Quarterly Report, 1 January 1979-31 March 1979.
May 79, 36p
Contract ET-78-S-01-3031

The linear programming analysis has been completed and is highlighted herein. (A special report, to be published shortly, will detail these findings.) Initial flowsheet modelling activity is reported. The modelling is confined to the hydrogasifier section of the plant, and it shows agreement with the linear programming model. The modelling also demonstrates that the failure to crack tars has a deleterious effect on the RBR heat balance. Definition of the design activity for the coal feeding, transport, and injection system has also been completed. (ERA citation 05:030061)

FE-3044-T12 PC A16/MF A01
Air Products and Chemicals, Inc., Allentown, PA.
Cryogenic Methane Separation/Catalytic Hydrogasification Process Analysis. Final Report.
A. A. Cassano, M. F. Hilton, T. C. Li, and T. R. Tsao. 14 Feb 80, 356p
Contract ET-78-C-01-3044

The objective of this program was to recommend the most attractive combinations of acid gas removal methane separation systems for the Exxon Catalytic Coal Gasification (CCG) and the Rockwell Hydrogasification process currently undergoing development supported by DOE. The program was comprised of the following tasks. Screening to define the most promising integration scheme for each gasification process; development of a process flowsheet, heat and material balance, P and ID, equipment specification, utility summary, and plot plan for the process combination selected; and preparation of detailed economic and final report. The results of the study are documented in this report. The evaluations were performed using data supplied by the prime coal gasification contractors and the vendors of proprietary acid gas removal processes. This information, combined with Air Products' in-house capabilities in acid gas and cryogenic separation processses, was used to develop process designs and cost estimates for each integrated system. The design based and economic criteria employed in the study are described. (ERA citation 05:030100)

JAERI-M-8183 PC A05/MF A01
Japan Atomic Energy Research Inst., Tokyo.
Research and Development of Water-Borne Paints by Radiation-Induced Emulsion Polymerization, (1). Design and Construction of the Pilot Plant.
K. Makuuchi, H. Ito, Y. Kasahara, A. Kataka, and M. Hagiwara. Mar 79, 87p
In Japanese.
U.S. Sales Only.

To study feasibility of the radiation-induced emulsion polymerization process for preparation of water-borne paints, a pilot plant for the purpose has been designed and constructed. Described are basic ideas of the plant and its construction and operation. The pilot plant is for chemical engineering study of the process and properties acertainment of the paints prepared with radiation polymerized emulsion. The plant consists of a reactor of capacity 70 cm exp 3 and three systems respectively of monomer feed, temperature control and emulsion sampling. Stainless steel 316 is used where in contact with the monomer. Irradiation with C0-60 sources can be in two alternative ways; i.e. inside and outside of the reactor. The polymerization temperature is between 20 exp 0 C and 80 exp 0 C. (Atomindex citation 11:508591)

LBL-10319 PC A03/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Chemical Process Research and Development Program, FY 1979.
Feb 80, 42p
Contract W-7405-ENG-48

This report contains the annual progress attained within the Energy and Environment Division of Lawrence Berkeley Laboratory in 1979. Separate abstracts are prepared for individual items. (ERA citation 05:030407)

MLM-2736 PC A02/MF A01
Mound Facility, Miamisburg, OH.
Use of Pulsed NMR to Estimate the Fuel Yield of Eastern Gas Shales.
B. D. Craft, and A. Attalla. 16 Jul 80, 16p
Contract AC04-76DP00053

A pulsed NMR (nuclear magnetic resonance) technique was applied to the estimation of fuel yield of Devonian gas shale. NMR proton spins were correlated with oil yield, with hydrocarbon gas yield, and with percent organic carbon as determined by material balance assay. Correlation coefficients of approximately 0.85 were obtained. Improvement in correlation is limited by the imprecision of the material balance assay at the relatively low fuel levels encountered with the various shale samples. (ERA citation 05:030219)

ORNL/MIT-310 PC A03/MF A01
Oak Ridge National Lab., TN.
Vapor-Liquid Equilibrium Model for a Partially Miscible Multicomponent System: Isopropanol-Acetone-Ethanol-N-Butanol-Water.
J. H. Chronis, and M. Amrhein. Jul 80, 29p
Contract W-7405-ENG-26

Normal butanol, a potential diesel fuel additive, can be produced by the fermentation of paper pulp waste streams by Clostridia with isopropanol, ac-

stone, and ethanol produced as byproducts. To design a distillation process for the recovery of n-butanol from fermentation broth, the vapor-liquid equilibria for the multicomponent system isopropanol-acetone-ethanol-n-butanol-water were modeled using Wilson equations to predict liquid activity coefficients. An extra parameter was added to the Wilson correlation to allow for the partial miscibility between butanol and water. The accuracy of the model was tested by comparing the predicted vapor composition with experimentally obtained values in the immiscible region. Even with the extra parameter, the model did not predict a miscibility gap between n-butanol and water, and the vapor-liquid equilibria were predicted with an accuracy of +-0.15 mol fraction. (ERA citation 05:030359)

ORNL/TM-6647/V2 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Advanced Technology Section Semiannual Progress Report, April 1, 1978-September 30, 1978. Volume 2. Engineering Science Programs.
J. S. Watson, and S. D. Clinton. Jul 80, 110p
Contract W-7405-ENG-26

Separate abstracts were prepared for each of the three sections: chemical engineering research; hydrogen isotope technology; and resource recovery. (ERA citation 05:030133)

PB80-224942 PC **A03**/MF **A01**
Puerto Rico Univ., Mayaguez. Water Resources Research Inst.
The Wet-Air Oxidation of Rum Distillery Wastes.
Rafael Munoz-Candelario, Manuel Pedraja-Santos, Abraham Rodriguez-Ramirez, Juan Hernandez, and Guillermo Colon Burgos. Feb 79, 27p W80-06559, OWRT-A-048-PR(1)

The disposal of rum distillery wastes is one of the major problems facing the rum industry in Puerto Rico. Conventional biological treatment methods have been considered as likely candidates for treatment of the wastes. Their cost, however, has been found to be very high, mainly because of the high contents of organic matter of the material being handled. The study was aimed at determining the feasibility of oxidizing rum distillery wastes using a wet-air oxidation process, with and without catalysts. The aqueous-phase oxidation of rum distillery wastes was done batchwise at temperatures ranging from 350F to 550F and at air pressures from 500 psig to 2000 psig. The maximum percent conversions obtained were 67.2% in biochemical oxygen demand, 54.4% in chemical oxygen demend, 58.8% in total organic carbon, and 60.8% in total carbon.

PB80-225725 PC **A06**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Sulfide Precipitation of Heavy Metals.
Final rept. Oct 77-Jul 79,
Alan K. Robinson, and Joyce C. Sum. Jun 80, 121p D6-42205-5, EPA-600/2-80-139
Grant EPA-S-805413

The research program was initiated with the objective of evaluating a new process, the sulfide precipitation of heavy metals from industrial wastewaters. The process was expected to effect a more complete removal of heavy metals than conventional lime processing because of the much lower solubilities of metal sulfides than hydroxides. Five processes were compared in bench-scale, continuous-flow equipment: conventional lime processing, conventional lime processing plus filtration, lime with a sulfide polishing and filtration, lime with sulfide, and lime with sulfide plus filtration. Samples of actual wastewaters from 14 metal working industries (including Boeing) were processed through the bench-scale equipment using all five processes. Reductions in the concentrations of cadmium, chromium, copper, nickel, and zinc, plus selected other metals were measured by atomic absorption chemical analysis. Capital and operating costs for the five processes were comprised for three plants sizes: 37.85 cu m/day (10,000 gal/day), 757 cu m/day (200,000 gal/day), and 1,893 cu m/day (500,000 gal/day). The report recommends that, to reduce the levels of cadmium, copper, nickel, or zinc, from a wastewater treatment plant using conventional lime processing, the addition of a final filtration should be considered first. The sulfide process did not significantly reduce the levels of these metals. Details are included on the use of a specific ion electrode for the control of sulfide additions. The report does not include comparison testing of the commercial Sulfex process.

PB80-853443 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ion Exchange Resins. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 286p
NERACEDBNT0395
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports discussing ion exchange resins and materials and their applications, including recovery, purification and treatment of uranium, plutonium, thorium, and other heavy metals, of radioactive wastes, of water and other various substances. The use of ion exchange resins in nuclear reactors and power plants and in chemical reactions and procedures are presented as well. (Contains 136 citations.)

PB80-853450 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ion Exchange Resins. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 305p
NERACUSGNT0395
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which discuss the preparation and applications of ion exchange resins, including their utility as catalysts and in treatment of water and wastes, chemical analysis and reactions, nuclear fuels and reactors and in various recovery, purification and separation processes. (Contains 103 citations.)

PB80-853864 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Catalytic Cracking. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 105p
NERACUSGNT0594
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on applications of catalytic cracking in fluidized beds, moving beds, refineries, vacuum distillations, reformers and other processes. Design criteria, models, controls and operating procedures are also discussed. (Contains 050 citations.)

PB80-855794 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Desalination of Water. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 91p NERACUSGNT0379
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide reports are cited on desalination of water. The following topics are included, energy and economics, special development processes, membrane and reverse osmosis technology and solar energy. (Contains 155 citations.)

PB80-855802 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Desalination of Water. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 163p
NERACEDBNT0379
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide reports are cited on desalination of water. The following topics are included, energy and economics, special development processes, membrane and reverse osmosis technology and solar energy. (Contains 079 citations.)

PB80-855810 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Desalination of Water. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 168p NERACEI NT0379
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide reports are cited on desalination of water. The following topics are included: energy and economics, special development processes, membrane and reverse osmosis technology and solar energy. (Contains 200 citations.)

PB80-855901 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gamma Rays Used in Chemical Processes. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jul 80, 56p NERACIAANT0744
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the effects, uses, and behavior of gamma rays used in chemical processes such as radiation-initiated polymerization and graft copolymerization, radiation degradation, isomerization, and bulk polymerization. Citations include manufacturing processes of polyvinyls, plastics sheets, polyethylenes, and synthetic polymers. (Contains 152 citations.)

PB80-855919 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gamma Rays Used in Chemical Processes. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 237p NERACEI NT0744
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the effects, uses, and behavior of gamma rays used in chemical processes such as radiation-initiated polymerization and graft copolymerization, radiation degradation, isomerization, and bulk polymerization. Citations include manufacturing processes of polyvinyls, plastics sheets, polyethylenes, and synthetic polymers. (Contains 115 citations.)

PB80-857287 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Catalytic Cracking. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 177p NERACEI NT0594
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on applications of catalytic cracking in fluidized beds, moving beds, refineries, vacuum distillations, reformers and other processes. Design criteria, models, controls and operating procedures are also discussed. (Contains 108 citations.)

PB80-857295 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Catalytic Cracking. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 200p
NERACEDBNT0594
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on applications of catalytic cracking in fluidized beds, moving beds, refineries, vacuum distillations, reformers

and other processes. Design criteria, models, controls and operating procedures are also discussed. (Contains 140 citations.)

PB80-858327 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Coal Products. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 105p NERACIAANT0584
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports from worldwide research are cited, covering information on coal products, derived from coal, carbon, or graphites, used in various industries. Applications, testing and analyses of the different coal products are also included. (Contains 083 citations.)

PB80-858335 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Coal Products. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 203p NERACEI NT0584
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports from worldwide research are cited, covering information on coal products, derived from coal, carbon, or graphites, used in various industries. Applications, testing and analyses of the different coal products are also included. (Contains 166 citations.)

PB80-858343 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Coal Products. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 174p
NERACEDBNT0584
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports from worldwide research are cited, covering information on coal products, derived from coal, carbon, or graphites, used in various industries. Applications, testing and analyses of the different coal products are also included. (Contains 133 citations.)

PB80-858350 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Coal Products. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 211p
NERACUSGNT0584
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports from worldwide research are cited, covering information on coal products, derived from coal, carbon, or graphites, used in various industries. Applications, testing and analyses of the different coal products are also included. (Contains 192 citations.)

PB80-858491 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Nylon Products. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 225p
NERACUSGNT0562
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports from worldwide research are cited, covering the use of nylons in machinery, electrical and mechanical devices. Physical, chemical and mechanical properties are also included. (Contains 120 citations.)

PB80-858509 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Nylon Products. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 218p NERACEI NT0562
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports from worldwide research are cited, covering the use of nylons in machinery, electrical and mechanical devices. Physical, chemical and mechanical properties are also included. (Contains 143 citations.)

SAND-80-1426 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Coal Liquefaction Process Research. Quarterly Report for January-March 1980.
T. C. Bickel, R. M. Curlee, B. Granoff, T. D. Padrick, and F. V. Stohl. Jun 80, 59p
Contract AC04-76DP00789

The overall objectives are to: (1) provide a fundamental understanding of the chemistry of coal liquefaction; (2) determine the role of catalysts in coal liquefaction; and (3) determine the mechanism(s) of catalyst deactivation. The program is composed of three major projects: Short-Contact-Time Coal Liquefaction, Mineral Effects, and Catalyst Studies. These projects are interdependent and overlap significantly. We present our results in such a manner that the interrelationships will be clearly seen. The tasks associated with each project are outlined and specific accomplishments described. (ERA citation 05:030120)

UCRL-52942 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Economics of Shale Oil Production by Radio Frequency Heating.
R. G. Mallon. 7 May 80, 11p
Contract W-7405-ENG-48

A conceptual facility for the production of shale oil by radio frequency(rf) heating has been designed to evaluate the economic feasibility of this technique. In the proposed procedure, the shale is processed in situ without being rubbed or explosively fractured. Metal electrodes inserted in a set of vertical drill holes are energized by a group of rf oscillators. The holes bound a block of shale that is to be retorted. The electric field is developed in such a way that heating within the block is almost uniform, and heating outside the block is very low. Retorting of the shale results in a pressure buildup of the hydrocarbon fluids. The oil and gas move horizontally (parallel to bedding planes), then down the electrode holes to a collection manifold. The facility schedule is planned so that off-peak electric power from existing generating stations can be used to operate the oscillators. Thus, the cost of power and the capital requirements for the facility are held to a minimum. Oil production costs and capital requirements indicate that the proposed procedure is economically attractive. The two principal costs are purchase of electric power and mining operations. The largest capital requirement is oscillators and associated electrical equipment. (ERA citation 05:028412)

7B. Inorganic Chemistry

PB80-852403 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Software Interpreters. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 74p
NERACUSGNT0539
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design and application of interpretive programming languages, for use in microprocessors, minicomputers, and main frames. (Contains 071 citations.)

PB80-855539 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Preparation, Properties, and Applications of Transition Metal Carbonyls. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Lawrence H. Marcus. Jun 80, 32p
NERACIAANT0400
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with the preparation, properties and applications of transition metal carbonyls. Applications include sintering, lasers and catalytic reactions. (Contains 031 citations.)

PB80-855554 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Preparation, Properties, and Applications of Transition Metal Carbonyls. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 125p
NERACEDBNT0400
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with the preparation, synthesis, properties, behavior and applications of transition metal carbonyls. Applications include catalysis reactions and coal gasification. (Contains 127 citations.)

7C. Organic Chemistry

AD-A088 354/6 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Chemistry
The Synthesis of 3,3-Difluoroallyl Derivatives of Silicon by an Organophosphorus Route.
Technical rept.,
Dietmar Seyferth, Karl R. Wursthorn, Thomas F. O. Lim, and Dennis J. Sepelak. 6 Aug 80, 25p
Rept no. TR-11
Contract N00014-76-C-0837

3,3-Difluoroallylderivatives of silicon have been prepared by the reaction of difluorochloromethane with ylides of type Ph3P=CHCH2SiR3 (SiR3 = SiMe3, SiMe2H, SiMe2OSiMe3, SiMe(OSiMe3). Also prepared by this procedure was Me3SiCH2C-2 (CH3)=CF2, but Me3SiCH2c(C6H5)=CF2 could not be prepared in this way, probably because the ylide, Ph3P=C(C6H5) CH2SiMe3 was not sufficiently basic to deprotonate HCF2C1. The thermal stability of Me3SiCH2CH=CF2 was assessed and a few of its reactions examined: addition of CCl2 and CBr2 (generated via the appropriate PhHgCX2Br) and addition-elimination reactions with phenyl- and n-butyllithium to give Me3SiCH2CH=C(R)F (R = Ph, sub bar n-Bu). (Author)

JAERI-M-8071 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Synthesis of exp 14 C-Labeled Polychlorinated Biphenyls Corresponding to Kanechlor KC-300, -400, -500 and KC-600.
T. Moriya, T. Moqi, H. Matsuoka, and K. Hoizumi. Jan 79, 26p
In Japanese.
U.S. Sales Only.

Carbon-14 labeled Kanechlors were synthesized in high radiochemical purity. "Kanechlors" commercially available polychlorinated biphenyls from Kanegafuchi chemical Industry Co. Ltd., are classified into six types. In order to establish a synthetic method for each type of Carbon-14 labeled Kanechlor, the following experiments were carried out. 1) Distribution patterns and molecular formula of the components of Kanechlors were analyzed with gas chromatography and mass spectrometry. 2) A mixture of chlorobiphenyl isomers was synthesized by direct chlorination of exp 14 C-Biphenyl with chlorine gas in the presence of ferric chloride. 3) The structure of major components of the Carbon-14 labeled products was identified by comparing the retention times of products with those of Kanechlors of known structure. 4) Optimum reaction

condition were studied to prepare Carbon-14 labeled polychlorinated biphenyls with the same composition as Kanechlors KC-300, KC-400, KC-500 and KC-600. (Atomindex citation 11:508573)

PAT-APPL-6-165 690 PC A02/MF A01
Department of Health and Human Services, Washington, DC.
A Short Total Synthesis of Dihydrothebainone, Dihydrocodeinone, and Nordihydrocodeinone.
Patent Application,
Kenner C. Rice. Filed 3 Jul 80, 14p PB80-224165
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method is presented for producing morphinan compounds which incorporates double advantages over the prior art, such as the utilization of beta, gamma-unsaturated ketones in place of the alpha, beta-unsaturated bromoketones proceed to 1-bromo-N-formlynordihydrothebainone (morphinan) there are utilized super acids, such as trifluoromethane sulfonic, trifluoroethane sulfonic and mixtures thereof, and also antimony pentafluoride and mixtures of hydrogen fluoride and antimony pentafluoride. Super acids work, whereas the prior art shows that cyclization in the presence of acids, even strong acids, such as sulfuric, phosphoric, do not work.

PB80-225394 Not available NTIS
National Bureau of Standards, Washington, DC.
Phosgene in the Thermal Decomposition Products of Poly (Vinyl Chloride): Generation, Detection and Measurement.
Final rept.,
J. E. Brown, and M. M. Birky. Aug 80, 9p
Pub. in Jnl. of Analytical Toxicology 4, p166-174 Jul-Aug 80,

An analytical study was made to determine whether carbonyl chloride (phosgene) is formed during the thermal decomposition of poly(vinyl chloride), PVC. Four methods of decomposition were studied: (1) thermal degradation of PVC in a resistively heated furnace, (2) electrical overloading of a PVC clad wire, (3) electrical arcing between electrodes partially covered with PVC, and (4) electric arc initiated flaming combustion in a cup furnace. Results are reported which show that significant quantities of phosgene can be generated from PVC by the electric arc method. Lesser amounts were found in the other scenarios. The measurements, identification and quantification of phosgene in the decomposition product, were obtained through the use of gas chromatography, infrared spectroscopy and mass spectroscopy. Reaction mechanisms are suggested.

PB80-855828 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Radiation Curing of Polymers. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 48p NERACUSGNT0371
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide reports are cited on research and development and applications of radiation curing of polymers. Ultraviolet, photoinitiated, vacuum irradiated, and microwave curing or crosslinking of coatings, adhesives and elastomers with physical and mechanical properties are also included. (Contains 040 citations.)

7D. Physical Chemistry

AD-A087 958/5 PC A02/MF A01
Rochester Univ Ny Dept of Chemistry
F + H2 Collisions in the Presence of Intense Laser Radiation: Reactive and Nonreactive Processes.
Paul L. DeVries, Thomas F. George, and Jian-Min Yuan. 5 Dec 78, 10p AFOSR-TR-80-0511
Contract F49620-78-C-0005
Prepared in cooperation with Drexel Univ., Philadelphia, PA. Dept. of Physics and Atmospheric Science. Pub. in Faraday Discussions of the Chemical Society, n67 p90-96 1979.

No abstract available.

AD-A088 043/5 PC A02/MF A01
California Univ Santa Barbara
Sulfur Modifies the Chemisorption of Carbon Monoxide on Rhodium/Alumina Model Catalysts.
Technical rept.,
R. M. Kroeker, W. C. Kaska, and P. K. Hansma. 29 Jul 80, 15p Rept no. TR-3
Contract N00014-78-C-0011

The effect of D2S on the chemisorption of CO on supported rhodium is examined with tunneling spectroscopy. It is seen that for low concentrations, D2S decreases the density of species with two CO molecules per Rh atom and increases the density of species with one CO molecule per Rh atom. At higher concentrations D2S decreases the density of all types of adsorbed CO. (Author)

AD-A088 044/3 PC A02/MF A01
California Univ Santa Barbara
Vibrational Spectra of Carbon Monoxide Chemisorbed on Alumina-Supported Nickel Particles: A Tunneling Spectroscopy Study.
Technical rept.,
R. M. Kroeker, W. C. Kaska, and P. K. Hansma. 29 Jul 80, 24p Rept no. TR-4
Contract N00014-78-C-0011

tunneling spectroscopy is used to study the chemisorption of CO on small nickel particles. The particles are grown from vapor on a thermally oxidized aluminum substrate. Carbon monoxide is observed to chemisorb in at least four distinct ways, giving CO stretching frequencies of 256.5, 246, 222 and 207 meV. The 256.5 meV species has low frequency modes at 45.5 and 59.5 meV. The low frequency modes of the remaining three species are not resolved sufficiently for identification. The frequencies of all modes were found to have some coverage dependence. The largest shift is seen in a CO stretching vibration that moves from 200 to 207 meV with increasing coverage. The effect of H2 co-adsorption is examined and evidence for the presence of oxygen on the particles is presented. The reaction of the chemisorbed CO with H2 on these nickel particles is found to produce very little surface hydrocarbon in contrast to results found previously for rhodium particles under similar conditions. (Author)

AD-A088 045/0 PC A03/MF A01
California Univ Santa Barbara
Evidence for an Oxygen Intermediate in the Catalytic Reduction of NO by CO on Rhodium Surfaces.
Technical rept.,
L. H. Dubois, P. K. Hansma, and G. A. Somorjai. 29 Jul 80, 29p Rept no. TR-5
Contract N00014-78-C-0011

Evidence for an oxygen intermediate in the reaction of NO and CO to form N2 and CO2 over rhodium surfaces is presented. High resolution electron energy loss spectroscopy (ELS) measurements indicate that both NO and CO molecules associatively adsorb on the Rh(331) single crystal surface at 300 K. Chemisorbed NO readily dissociates on this surface upon heating at 450 K. At 700 K high resolution ELS and Auger electron spectroscopy (AES) both indicate that only oxygen is present on the catalyst surface. N2 desorption below this temperature is easily detected by mass spectroscopy. The addition of CO to this surface oxygen at 700 K results in the formation of gaseous CO2 and the removal of the surface oxygen species. Similar results were obtained when O2 was substituted for NO as a control indicating that oxygen is indeed a surface intermediate under our experimental conditions. (Author)

AD-A088 053/4 PC A03/MF A01
Naval Research Lab Washington DC
Opto-Acoustic Studies of Methane Impurities in Argon.
Memorandum rept. Oct 78-Oct 79,
D. H. Leslie, and G. L. Trusty. 30 Jul 80, 26p
Rept no. NRL-MR-4283

An opto-acoustic detection system has been constructed for detecting absorption of DF laser radiation. Absorption by methane in argon has been observed at 13 DF lines. The system was calibrated using independently measured absorption line parameters for CH4 broadened by argon at the DF line P sub 2(8).

AD-A088 102/9 PC A02/MF A01
Arizona Univ Tucson Dept of Chemistry
An Ion-Selective Electrode for the Determination of Phencyclidine (PCP).
Technical rept. no. 2, Dec 79-Jun 80,
Charles R. Martin, and Henry Freiser. 6 Aug 80, 14p
Contract N00014-78-C-0001

An ion-selective electrode responsive to the protonated form of phencyclidine (PCP+) is described. This electrode is based on incorporating PCP+ as its dinonylnaphthalenesulfonate in a plasticized poly(vinylchloride) membrane. The electrode has very good selectivity with respect to inorganic and small organic cations. The detection limit is about 10 to the -5.1 power M. In addition to application for direct potentiometric analysis of PCP+, successful use as an indicator electrode in potentiometric titration of PCP+ as concentrations as low as .0001 M is described. (Author)

AD-A088 107/8 PC A02/MF A01
Naval Research Lab Washington DC
XUV Aluminum Spectra of Laser-Produced Plasmas.
Interim rept.,
G. A. Doschek, and U. Feldman. 15 Jul 80, 15p
Rept no. NRL-8416

XUV aluminum spectra from 200 to 500 A of laser-produced plasmas are discussed. The plasmas were obtained by focusing Nd:glass and CO2 laser pulses onto planar targets. The spectrograph was a normal incidence instrument without an entrance slit. Therefore monochromatic images of the plasma are formed at the focal plane, rather than spectral lines. Kodak 101 film was used to record the spectra. Images of the plasmas due to transitions in Al V through Al X were identified using a theoretical synthetic aluminum spectrum. The time- and space-integrated relative numbers of the ions form Al V through Al X can be obtained from a comparison of the synthetic and laser-plasma spectra. The comparison enables determination of the film calibration curve and the efficiency of the instrument with wavelength. The morphology of the expansion of the plasma is also discussed. The plasma of the highest temperature ions (Al X) expands outward in cylindrially shaped structures. The expansion of the lower temperature plasma (such as Al VII) is also cylindrical in appearance, but the images are not as tightly confined to the target normal as for the hotter ions. (Author)

AD-A088 117/7 PC A02/MF A01
Cornell Univ Ithaca NY Baker Lab
Dynamics of the Chemistry of Electronically Excited Atoms in Defined Quantum States.
Final rept. 1 Apr 75-31 May 80,
John R. Wiesenfeld. 15 Aug 80, 15p
Contract N00014-75-C-0828

The work described here involved the study of halogen atom production and removal following photodissociation of halogens, pseudohalogens and halides. Both collisional quenching and chemical reaction were seen. Electronic angular momentum conservation led to state-selective chemistry. (Author)

AD-A088 118/5 PC A03/MF A01
California Univ Berkeley Lawrence Berkeley Lab
The Application of High Resolution Electron Energy Loss Spectroscopy to the Study of Model Supported Metal Catalysts.
Technical rept.,
L. H. Dubois, P. K. Hansma, and G. A. Somorjai. 29 Jul 80, 27p Rept nos. LBL-10733, TR-6
Contract N00014-78-C-0011

Model supported metal catalysts were fabricated by evaporating a small quantity of rhodium onto an oxidized aluminum substrate. High resolution electron energy loss spectroscopy (ELS) was successfully used to obtain the vibrational spectra of carbon monoxide chemisorbed on these model catalysts. The ELS spectra are compared with vi-

brational spectra obtained by infrared spectroscopy and inelastic electron tunneling spectroscopy for CO chemisorbed on similar model catalysts. (Author)

AD-A088 140/9 Not available NTIS
Joint Inst for Lab Astrophysics Boulder CO
Emission of Mg-Xe Discharge and the MgXe Excimer Band,
L. Schumann, D. Wildman, and A. Gallagher. 28 Dec 79, 4p
Contract N00014-76-C-0123
Availability: Pub. in Jnl. of Chemical Physics, v72 n11 p6081-6084, 1 Jun 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 141/7 Not available NTIS
Joint Inst for Lab Astrophysics Boulder CO
Na 32P-32D Line Broadening by Ne, Ar, and Xe,
D. W. Wildman, L. W. Schumann, and A. C. Gallagher. 2 Oct 79, 5p
Contract N00014-76-C-0123
Availability: Pub. in Jnl. of Quantitative Spectroscopy and Radiative Transfer, v24 p19-23 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 207/6 PC **A03**/MF **A01**
Washington Univ Seattle Dept of Chemistry
Error Propagation and Optimal Performance in Multicomponent Analysis.
Interim technical rept.,
Clemens Jochum, Peter Jochum, and Bruce R. Kowalski. Aug 80, 36p Rept no. TR-17
Contract N00014-75-C-0536

A study of error propagation for multicomponent analysis in the presence of sample related interferences by the generalized standard addition method has been made. The results of the examination have lead to an alternate experimental design and optimal computation algorithms which are tested using a four component spectrophotometric analysis. Additionally, the theory describes fundamental constraints to multicomponent analysis in the presence of chemical, physical and spectral interferences. (Author)

AD-A088 211/8 PC **A04**/MF **A01**
Indiana Univ At Bloomington Dept of Chemistry
A Linear Response Theory Approach to Time-Resolved Fluorimetry.
Interim technical rept.,
G. M. Hieftje, and E. E. Vogelstein. 18 Jul 80, 52p Rept nos. TR-26, 33
Contract N00014-76-C-0838

A new conceptual and instrumental approach to time-resolved chemical measurements is presented. Based on the concepts of information and linear response theory, the new approach is applicable to a number of different areas, including nuclear magnetic resonance spectrometry, high-speed kinetic measurements, gas chromatographic analysis, and time-resolved luminescence spectrometry. In the particular examples given, the new approach is applied to the determination of luminescence lifetime. Accuracy and simplicity of the method are emphasized and its application to chemical analysis discussed. (Author)

AD-A088 236/5 PC **A06**/MF **A01**
Catholic Univ of America Washington DC Vitreous State Lab
Composition and Temperature Dependence of Shear Viscosity of Hydrocarbon Mixtures.
Final technical rept. 1 Jun 79-31 May 80,
M. Adel-Hadadi, A. V. Lesikar, and C. T. Moynihan. Jul 80, 107p
Contract N00019-79-C-0329

Shear viscosities and densities have been measured from 50 C to as low as -56 C for five C10 hydrocarbons: n-decane, n-butyl cyclohexane, cis-decalin, n-butyl benzine and 2,7-dimethyl octane and their mixtures. A literature review of theories of hydrocarbon mixture viscosities has been carried out. It is shown that previous theories, in general, cannot give a good account of the mixture viscosities over the wide temperature range covered in this study. Two simple semi-empirical equations have been developed and applied to the description of the combined composition-temperature dependence of the viscosity of both the hydrocarbons studied under the present contract and two polycyclic hydrocarbons studied under a parallel Air Force Contract. The equations assume additivity of component free volumes in the mixtures and contain no more adjustable parameters than are required to account for the viscosities of the pure hydrocarbon components. (Author)

AD-A088 268/8 PC **A04**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Identification and Quantification of Hydrocarbon Products in Effluents.
Interim rept.,
R. S. Vogel, W. J. Mikucki, R. J. Fileccia, and R. G. Lampo. May 80, 62p Rept no. CERL-IR-N-91

This report documents interim results of a study to (1) investigate the capability of infrared (IR) spectroscopy for the identification of specific hydrocarbon products in effluents from washracks and other vehicle serivce operations at Army installations, and (2) make a comparative evaluation of the Environmental Protection Agency's (EPA) gravimetric (STORET 00556) and IR (STORET 00560) methods of quantifying 'total hydrocarbons' in wastewater. Results have shown that IR spectroscopy can provide a basis for the identification of hydrocarbon products for which reference samples are available. In the initial phase of the work, a scheme of sequential discriminant analysis and pattern recognition was used with reference to a file of military specification (MIL SPEC) hydrocarbon products used in servicing wheel- and track-type Army vehicles. The complexity of IR data reduction was shown to increase rapidly with the number of hydrocarbon products present in a given sample -- a result of a similarity in the hydrocarbon components' molecular structure. The use of gas-liquid chromatography (GLC) in conjunction with IR spectroscopy provided additional discrimination and simplified data reduction. A comparative investigation of the gravimetric vs IR methods for the quantification of 'total hydrocarbons' in wastewater showed that the IR method was capable of higher precision than the gravimetric method at hydrocarbon concentrations less than 10 mg/l, and could provide information on chemical composition and consequently the origin of the hydrocarbon product.

AD-A088 269/6 PC **A05**/MF **A01**
Arnold Engineering Development Center Arnold Air Force Station TN
Infrared Optical Properties of Thin CO, NO, CH4, HC1, N2O, O2, N2, Ar, and Air Cryofilms.
Final rept. 1 Oct 78-1 Sep 79,
J. A. Roux, B. E. Wood, A. M. Smith, and R. R. Plyler. Aug 80, 87p Rept no. AEDC-TR-79-81
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

The infrared spectral transmittance of cryofilms formed by CO, NO, CH4, HC1, N2O, O2, N2, Ar, and air were measured. These films were condensed on a 20 K germanium substrate and ranged in thickness from 0.25 to 15 micrometer; the deposition pressure for the films was 2 x 10 to the -7th power torr. Transmission spectra were obtained for the 500- to 3700/cm wavenumber range using a Fourier transform spectrometer. Values of complex index of refraction (n = n - ik) for the cryodeposits were derived from the experimental data using an analytical model and the nonlinear least-squares method. The analytical model treats the germanium as a thick noninterfering film and the deposit as a thin film. Results from the least-squares method are also compared with a Kramers-Kronig determination of the real part of the index of refraction. The optical properties (n,k) of such cryofilms are reqiured for predicting the degradation of contaminated, cryogenically cooled optical surfaces. (Author)

AD-A088 283/7 PC **A04**/MF **A01**
Tennessee Univ Knoxville Dept of Chemistry
Low Temperature Fluorine Chemistry of Electronegative Elements.
Final rept. 1 Dec 76-29 Feb 80,
Gleb Mamantov, and Richard A. Crocombe. 15 Jul 80, 74p AFOSR-TR-80-0600
Grant AFOSR-77-3165

This program was concerned with the synthesis and characterization of fluorine-containing compounds by novel methods. A detailed study of the systems X2 + F2 where X = Cl, BR, or I was carried out, producing evidence for the new species XF2, X2F and X2F2 as well as some of the normally unfavored members of the series XFn (n = 1, 3, 5). High resolution infrared spectra of the interhalogen compounds ClF and BrCl were measured for the first time. The uses of an infrared laser to produce new species in matrices via multiphoton dissociation and to open new synthetic routes in the gas phase have been examined. A new technique of obtaining infrared spectra of short-lived species has been studied and its potential evaluated. (Author)

AD-A088 311/6 PC **A06**/MF **A01**
Oxford Univ (England) Inorganic Chemistry Lab
Electron Paramagnetic Resonance Spectroscopy of Vanadium (IV) Complexes and Related Species.
Final scientific rept. 1 Oct 77-31 Jul 80,
Kenneth R. Seddon. 27 Jul 80, 109p EOARD-TR-80-13
Grant AFOSR-77-3368

The report details the successful application of e.p.r. spectroscopy to the study of vanadium(IV) oxohalide complexes. In particular, it has proven an invaluable structural tool for relating the structure of a complex in an amorphous or polycrystalline sample to that of the same complex in solution. Moreover, solution studies by e.p.r. have revealed previously unsuspected dissociation and displacement phenomena for complexes of the type (VOX2Ln) (X=C1 or Br, L=mono- or bi-dentate ligand), which means that many literature reports need to be reexamined. A comprehensive literature survey is included. (Author)

AD-A088 447/8 PC **A02**/MF **A01**
IRT Corp San Diego CA
Chemical Reactions on Solid Surfaces Using Molecular Beam Techniques.
Final rept 1 Jan 72-30 Sep 80,
Robert L. Palmer. 31 Jul 80, 23p Rept no. IRT-8162-006
Contracts N00014-72-C-0247, N00014-77-C-0255

thermal energy molecular beams have been used to study chemical interactions with metal surfaces. Chemisorption of simple molecules such as H2, O2, CH4, C2Hx and CO was investigated on single and polycrystalline surfaces of Pt, Ni, Co, and Ag. Kinetic parameters and reaction mechanisms were determined for model catalytic reactions including CO and C2Hx oxidation and methanation from H2/CO mixtures. Chemical reactions of NOx with CO and D2 on Pt(111) and other surfaces have been surveyed and the kinetics of NO and O2 chemisorption have been measured. The theory of adsorption/desorption kinetics is reviewed and certain deficiencies identified. (Author)

AD-A088 459/3 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Mass Spectrometric Study of the Thermochemical Properties of Gaseous MgOH,
Edmond Murad. 6 Feb 80, 3p Rept no. AFGL-TR-80-0228
Pub. in Chemical Physics Letters, v72 n2 p295-296, 1 Jun 80.

No abstract available.

AD-A088 492/4 PC **A02**/MF **A01**
Battelle Columbus Labs OH
Molecular Hyperpolarizabilities. I. Theoretical Calculations Including Correlation,
Rodney J. Bartlett, and George D. Purvis, III. 7 Jun 79, 11p AFOSR-TR-80-0614
Contract F49620-78-C-0046
Pub. in Physical Review A, v20 n4 p1313-1322 Oct 79.

No abstract available.

AD-A088 494/0 PC **A02**/MF **A01**
California Inst of Tech Pasadena Arthur Amos Noyes Lab of Chemical Physics

Vibrational Deactivation on Chemically Reactive Potential Surfaces: An Exact Quantum Study of a Low Barrier Collinear Model of H + FH,D + FD, H + FD, and D + FH,
George C. Schatz, and Aron Kuppermann. 23 Mar 79, 9p CONTRIB-5936, AFOSR-TR-80-0608
Grant AFOSR-77-3394
Pub. in Jnl. of Chemical Physics, v72 n4 p2737-2743, 15 Feb 80.

No abstract available.

AD-A088 495/7 PC **A02/MF A01**
Science Applications Inc Dayton OH Theoretical Chemistry Div
Ab Initio Studies of Ion-Molecule Reactions. The N2O+(a4A doublet) Potential Energy Hypersurface for the O+(N2,N)NO+ Reactions,
Darrel G. Hopper. 1979, 4p AFOSR-TR-80-0611
Contract F49620-78-C-0050
Pub. in Jnl. de Physique, v7 n7 pC7-79-C7-80 Jul 79.

No abstract available.

AD-A088 498/1 PC **A02/MF A01**
Massachusetts Inst of Tech Cambridge Dept of Physics
Velocity Dependence of Rotational Energy Transfer Rates in Na(2)(*)-Xe,
Neil Smith, Timothy A. Brunner, Allan W. Karp, and David E. Pritchard. 3 Jun 79, 6p AFOSR-TR-80-0610
Grant AFOSR-76-2972
Pub. in Physical Review Letters, v43 n10 p693-697, 3 Sep 79.

No abstract available.

AD-A088 522/8 PC **A04/MF A01**
Colorado State Univ Fort Collins Dept of Chemistry
Vibronic Assignments and Vibronic Coupling in the 1E' State of Sym-Triazine by Two Photon Spectroscopy.
Technical rept.,
J. D. Webb, K. M. Swift, and E. R. Bernstein. 11 Aug 80, 60p Rept no. TR-1-2469
Contract N00014-79-C-0647

Two photon photoacoustically detected spectra are reported for the first excited singlet state 1E' of sym-triazine in the gas phase. The origin has been positively identified as of E' symmetry through contour calculations and hot band observations. The excited state absorption is dominated by a highly irregular progression. Observations are strongly supported by a Jahn Teller calculation which predicts: little coupling between A'2 and E' electronic manifolds; a large quadratic coupling and a small linear coupling in the E' manifold; and a quenched angular momentum in this state. Good agreement is shown to exist between one photon and two photon spectroscopic observations and the calculations.

ATR-80(7783)-1 PC **A03/MF A01**
Aerospace Corp., El Segundo, CA.
Laser Excited Nonresonant Fluorescence Spectroscopy. Second Annual Progress Report.
J. A. Gelbwachs, and R. P. Frueholz. 30 Jun 80, 45p
Contract AM03-76SF01101

The relative populations of numerous tin levels populated by collisional energy transfer from an initially laser pumped level were obtained. These populations yield information concerning the relative rates of energy transfer for the various buffer gases studied. The results indicated two distinct energy transfer behaviors. First, for certain tin levels diatomic collision partners produce populations nearly two orders of magnitude higher than when rare gases are present. This behavior is attributed to the effects of near-resonant energy transfer pathways for the E implies V/R and V/R implies E processes found in the diatomic collision partners. Second, for other tin levels, diatomics and rare gases transfer population approximately at the same rates and more efficiently than in the former case. For these levels the near-resonant pathways can be obscured by means of a more effective energy transfer channel common to both diatomics and rare gases such as by curve crossing mechanisms. (ERA citation 05:029777)

BNL-28029 PC **A02/MF A01**
Brookhaven National Lab., Upton, NY.
Picosecond Spectroscopic Search for Electron Transfer Reactions in Dimeric and Trimeric Reaction Center Models Containing Pyrochlorophyll/sub a/.
T. L. Netzel, R. R. Bucks, S. G. Boxer, and I. Fujita. 1980, 3p CONF-800827-1
Contract AC02-76CH00016
International conference on photochemical conversion and storage of solar energy, Golden, CO, USA, 3 Aug 1980.

To further understanding of the light driven electron transfer reactions found in natural photosystems, dimeric and trimeric model molecules containing PChl/sub a/ were studied. The potential donor and acceptor subunits were covalently linked to form a single large molecule. The distance between the donor and acceptor subunits was altered by using both 10 atom and 5 atom chains. The effects of altering the relative orientation of the donor and acceptor were probed by contrasting the kinetics observed with added pyridine to those observed with added alcohol. Solvent dielectric (epsilon) effects were studied by using three solvents: toluene (epsilon = 2), CH sub 2 Cl sub 2 (epsilon = 9) and CH sub 3 CN (epsilon = 39). Finally, the redox span of the potential photoproducts was also varied. Results are presented and discussed. Both PChl/sub a/ and PPheo/sub a/ give essentially the same fluorescence yield in the three solvents used, approx. 100 arbitrary counts. (ERA citation 05:031002)

BNL-28043 PC **A02/MF A01**
Brookhaven National Lab., Upton, NY.
Light Induced Electron Transfer Reactions of Metal Complexes.
N. Sutin, and C. Creutz. 1980, 22p CONF-800734-1
Contract AC02-76CH00016
International Union of Pure and Applied Chemistry symposium on photochemistry, Seafeld, Austria, 13 Jul 1980.

Properties of the excited states of tris(2,2'-bipyridine) and tris(1,10-phenanthroline) complexes of chromium(III), iron(II), ruthenium(II), osmium(II), rhodium(III), and iridium(III) are described. The electron transfer reactions of the ground and excited states are discussed and interpreted in terms of the driving force for the reaction and the distortions of the excited states relative to the corresponding ground states. General considerations relevant to the conversion of light into chemical energy are presented and progress in the use of polypyridine complexes to effect the light decomposition of water into hydrogen and oxygen is reviewed. (ERA citation 05:029404)

CEA-CONF-4547 PC **A03/MF A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Recherche et Analyse.
Principle, Possibilities and Applications of gamma Activation Analysis.
C. Engelmann. 1978, 31p CONF-780794-2
In French.Symposium on recent developments in activation analysis, Oxford, UK, 17 Jul 1978.
U.S. Sales Only.

The various photonuclear reactions suitable for analytical purposes, their specificity and their performances are reviewed. The influence of the experimental irradiation conditions on the theoretical detection limits permitted and on the relative importance of competitive nuclear reactions liable to interfere is examined, with special reference to the determination of carbon, nitrogen and oxygen. It is shown that these parasitic effects of nuclear origin may be eliminated by the choice of the maximum irradiation energy. Examples are given of applications relative to trace determinations of light elements, especially carbon, nitrogen and oxygen, in metals or semi-conductors and to instrumental multi-element analyses of biological materials, atmospheric sampling filters and above all agricultural products. (Atomindex citation 11:507641)

CEA-CONF-4626 PC **A02/MF A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services de Physique Generale.
Thermal Dependance of the Specular Peak of Helium Scattered from (100) Copper.
G. Armand, J. Lapujoulade, Y. Lejay, and N. Papanicolaou. 1979, 3p CONF-7805203-1
International symposium on molecular beams, Trento, Italy, 28 May 1978.
U.S. Sales Only.

The specular peak of a thermal energy beam of helium (64<E<250 meV) scattered from (100) copper depends upon surface temperature and incidence conditions according to a Debye-Waller mechanism provided that a Beeby correction has been introduced in order to account for the influence of the attractive potential well. In this paper an extension to the previous measurements to lower temperatures (70 K) and to lower beam energy (21 meV) is reported. (Atomindex citation 11:509394)

CEA-R-4968 PC **A03/MF A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France).
Global Determination of alpha Emitters (Exp 241 Am, exp 237 Np, exp 239 Pu, exp 232 Th) in Biological Media (Urine and Feces).
G. Bataller, O. de Vasson, R. Bazin, D. Bonnard, and M. Morello. Jan 79, 26p
In French.
U.S. Sales Only.

A technique is described in this paper which permits the determination of the gross alpha activity emitted by a mixture of specially radiotoxic elements in urine and feces. After reduction and adjustment of the solution at pH 5,0, the radionuclides are adsorbed on glass marbles. The elution is made in acid medium (HCl 6N). Under these conditions the chemical yields are very satisfying: 96+-6% for urine and 68+-9% for feces. In case of significant results at the end of the manipulation, the radioactive source quality is sufficient to allow the identification of the contaminating radionuclide(s) by alpha spectrometry. (Atomindex citation 11:507618)

CEA-R-4984 PC **A11/MF A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Genie Isotopique.
Contribution to the Study of the Structure and Lability of Uranium IV Complexes in Solution by Nuclear Magnetic Resonance and Relaxation.
C. Fouchet-Kiener. Jun 79, 229p
In French.
U.S. Sales Only.

The complexation of the paramagnetic ion U exp 4+ by various bases (beta -diketones, hexamethylphosphorotriamide, H sub 2 O, ...) is studied by NMR spectroscopy in the present work. The exp 13 C and exp 1 H NMR spectra of uranium IV (or thorium IV) dipivaloylmethanate and dibenzoylmethanate chelates were recorded in order to throw some light on the geometry of eight-coordinated uranium complexes in CS sub 2 solution. An analysis of the room temperature NMR paramagnetic shifts leads us to propose an average structure of the chelate between a square antiprism and a trigonal dodecahedron. Values for the contact shifts are deduced from the measurements and are interpreted in terms of electronic structure. An exp 1 H NMR study of U(dpm) sub 4 in CS sub 2 solution as a function of temperature shows an intramolecular rearrangement taking place between conformers of D sub 2 symmetry. From the exp 1 H rotating frame relaxation, the kinetics of the intramolecular motion and the susceptibility parameters of the complex are separately deduced. The results show that a ninth coordination site is necessarily involved. There is evidence of a first firmly bound nine coordinence hydration sphere and of a second more labile sphere. (Atomindex citation 11:507804)

CONF-7910122-13 PC **A02/MF A01**
Maryland Univ., College Park. Computer Science Center.
Electron Beam Experiments at Maryland University.
M. A. Brennan, P. Loschialpo, W. Namkung, M. Reiser, and J. D. Lawson. 1979, 8p
Contract AS05-78ER05940
Heavy ion fusion workshop, Berkeley, CA, USA, 29 Oct 1979.

An experimental study of the stability of intense electron beams is described. The purpose is to determine the emittance growth associated with aberrations arising from the non-uniform transverse density distribution in the beam, and to compare measurements with the results of computer simulations. (ERA citation 05:029772)

CONF-800568-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
SSMS Near Surface Analysis of B in Irradiated Zircaloy-2: Ion Implantation Standards as a Calibration Technique.
W. H. Christie, J. A. Carter, R. E. Eby, L. Landau, and W. R. Musick. 1980, 4p
Contract W-7405-ENG-26
28. annual conference on mass spectrometry and allied topics, New York, NY, USA, 25 May 1980.

Purpose of this study was to determine the amount of exp 10 B contamination on the surface of Zircaloy-2 clad irradiated fuel elements that had been stored in an aqueous solution containing 5000 wt. ppM enriched B. SMSS indicated that the contamination was less than 0.06 mu g/cm exp 2 . (ERA citation 05:029377)

CONF-800579-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Low Energy Electron Capture by Multicharged Ions from Hydrogen.
R. A. Phaneuf, D. H. Crandall, and F. W. Meyer. 1980, 4p
Contract W-7405-ENG-26
Technical committee meeting on atomic and molecular (a+m) data for fusion, Paris, France, 19 May 1980.

In order to systematically investigate the behavior of low energy electron capture cross sections, the cross sections were measured for Xe exp 2+ - Xe exp 12+ , Ar exp 2+ - Ar exp 9+ , and Fe exp 5+ - Fe exp 6+ in H and H sub 2 for $3 < E < 26$ keV/charge, and for C exp 3+ - C exp 5+ in H sub 2 for $0.15 < E < 0.45$ keV/charge. (ERA citation 05:029778)

CPAT-RA-1978 PC **A10**/MF **A01**
Toulouse-3 Univ. (France). Centre de Physique Atomique.
Toulouse Atomic Physics Center. Annual Report 1978.
D. Blanc. 206p
In French.
U.S. Sales Only.

The work of the Toulouse Atomic Physics Center is summarized under the following headings: gas discharges, atomic collisions, radiation physics, aerosols. (Atomindex citation 11:509338)

DOE/ER/03077-166 PC **A02**/MF **A01**
New York Univ., NY. Courant Mathematics and Computing Lab.
Implementation of the GAUSSIAN 78 Programs on the NYU VAX/11-780: A Probe into Basis Set and Correlation Effects on the Structure of Molecular Complexes.
S. Topiol, J. W. Moskowitz, R. Osman, and H. Weinstein. Apr 80, 22p
Contract AC02-ER03077

The program package is used in a theoretical study of molecular complexes that serve as models of drug receptor interactions. The complexes are of para-hydroxyaniline and meta-hydroxyaniline with formamidinium cation. Results indicate that the description of the nature of interaction obtained at the STO-3G SCF level does not change when the basis set is extended to the 4-31G level or when correlation effects are included to second order in a Moeller-Plesset formulation. 5 figures, 4 tables. (ERA citation 05:029383)

DOE/ER/10522-1 PC **A03**/MF **A01**
Rochester Univ., NY. Lab. for Laser Energetics.
Experiments with Very High-Power Lasers. Report of a Workshop, November 29-30, 1979.
1979, 39p
Contract AC02-79ER10522

Among possible experiments of general interest in physics are the study of the spectroscopy and cross section measurements of highly ionized species, the study of nuclear conversion processes, vacuum-ultraviolet lasers, multiphoton absorption, and the Kapitza-Dirac effect. Shock waves driven by ultrahigh-power lasers are capable of attaining pressures of the order of 1 to 4 TPa in material targets, providing a means of deriving equation-of-state data under such extreme conditions. Modifications observed in the structures of materials subjected to high-power laser radiation can lead to studies of damage and phase change processes. Classes of useful experiments in this area are given. The x rays produced when a pulse of ultrahigh-power laser radiation is focussed on a target are sufficiently intense to generate diffraction patterns and EXAFS spectra on a nanosecond time scale. A major application of ultrahigh-power lasers to chemistry and biology may consist in such time-resolved diffraction and EXAFS studies of dynamical systems. The laser systems at the National Laser User Facility at the University of Rochester are described. These systems are available to qualified investigators for user experiments. (ERA citation 05:031064)

FE-2408-10 PC **A05**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Chemical Engineering.
Study of the Mechanism of the Hydrogen Sulfide/Dolomite Reaction. Quarterly Report, October-December 1978.
K. Li, F. H. Rogan, J. H. Yen, and C. S. Huang. Mar 79, 84p
Contract EX-76-C-01-2408

Direct structural evidence was obtained this quarter to demonstrate that, at temperatures above 820 exp 0 C, the half-calcination reaction is of the pearlite type. Rate data indicate a gradual transition to a different mechanism as the temperature is lowered from 820 exp 0 C to 710 exp 0 C. The rate data fit the Avrami equation with $n = 2$ for temperatures above 820 exp 0 C, or with $n = 3/4$ for temperatures below 710 exp 0 C; for intermediate temperatures the data cannot be fitted using a single value of n. A basic model for sulfidation was completed, capable of successfully predicting experimentally observed weight changes for a wide range of operating conditions. The model contains no adjustable parameters. The ability of water or hydrogen to promote, or of CO sub 2 to retard sulfidation, observed experimentally, has yet to be incorporated into the model. Gas phase reactions among inlet species play a role in the CO sub 2 effect, while the effect of water or hydrogen is believed to be catalytic. The carbonation reaction was observed by SEM to occur essentially topochemically at high temperatures (above 700 exp 0 C). Test fits of the high temperature rate data to a shrinking core model assuming mass transfer control showed good agreement. At lower temperatures, however, the reaction appears non-topochemical. (ERA citation 05:030976)

GKSS-78/E/19 PC **A03**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Physik.
VDI Steam Tables (7TH Edition), Programmed in FORTRAN-IV.
H. Siewers. 1978, 26p
In German.
U.S. Sales Only.

The formulas given in the VDI steam tables (7th edition) are programmed in FORTRAN-IV. The necessary algorithms are described in detail in this paper. (Atomindex citation 10:426727)

IAEA-R-1449-F PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Characterization of Aerosols Produced in Atomic Energy Industries and its Application in Monitoring and Hazards Evaluation. Part of a Coordinated Programme in Environmental Monitoring for Radiation Protection in Asia and the Far East. Final Report for the Period 1 December 1973 - 31 October 1978.
P. Kotrappa. Nov 78, 33p
U.S. Sales Only.

This annual report summarizes investigations concerning various aspects of aerosols: modified double filter method for the measurement of radon or thoron in air; modified double filter apparatus for measuring radon and thoron in the environment and in exhaled breath; electrostatic charge on decay products of thoron; preparation of monodisperse tagged polystyrene aerosol using an aerosol centrifuge; the performance of aerosol centrifuges at unmatched and matched relative humidities between stream air and aerosol air; diffusion coefficients of decay products of radon and thoron; measurement of specific alpha radioactivity with respect to size for uranium ore dust using aerosol centrifuge; a study of the attachment of thoron decay products to aerosols using an aerosol centrifuge. (Atomindex citation 11:507659)

IAEA-R-1837-F PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Development and Medical Applications of a Simple Facility for Partial Body in Vivo Neutron Activation Analysis Using Californium-252 Sources. Final Report for the Period 1 September 1976 - 30 August 1977.
K. Boddy. Nov 78, 28p
U.S. Sales Only.

A simple and cheap facility for partial body neutron activation analysis has been designed, based on the use of two 100 mu g exp 252 Cf neutron sources. The results reported show that calcium can be measured in parts of the body such as the tibia with a precision as good as +- 1.6 % for a radiation dose of 2 rem. The uniformity of the thermal neutron flux density is better than +- 3 % over 10 cm. Some applications of this irradiation facility for studies of trace elements, in particular cadmium in liver and aluminium in liver or brain, have also been explored. However, the sensitivity attainable is not yet sufficient for the study of normal levels, but could be of interest in toxicological investigations. (Atomindex citation 11:508431)

INIS-mf-5456 PC **A07**/MF **A01**
Frankfurt Univ. (Germany, F.R.). Fachbereich Physik.
Inner-Shell Ionization in Heavy Ion Collisions.
G. Heiligenthal. 25 Apr 78, 130p
In German.Thesis.
U.S. Sales Only.

In this thesis the inner-shell ionization of heavy quasimolecular systems (U-U and Pb-Pb systems) induced by heavy ion collisions is investigated. A coupled-channel treatment of the many-particle Schroedinger equation leads to predictions of the probability for K-shell ionization and of total ionization cross sections, which are compared with experimental results. (Atomindex citation 11:507552)

INIS-mf-5468 PC **A09**/MF **A01**
Amsterdam Univ. (Netherlands).
Forward Dispersion Relation for Electron-Atom Scattering.
H. J. Blaauw. 6 Jun 79, 184p
Thesis.
U.S. Sales Only.

The form of the forward dispersion relation, which connects the real and the imaginary part of the forward elastic scattering amplitudes in collisions between electrons and atoms, is studied. (Atomindex citation 11:506433)

INIS-mf-5469 PC **A07**/MF **A01**
Technische Hogeschool, Eindhoven (Netherlands).
Measurements of Small Angle Elastic and Rotationally Inelastic Scattering of CsF with Rare Gas Atoms.
J. M. Henrichs. 29 Jun 79, 128p
Thesis.
U.S. Sales Only.

The author has measured inelastic cross-sections of CsF molecules, selected into a particular rotational state with quantur numbers (j.msub(j)), scattered from Ar and Kr atoms. With the aim of obtaining information about the anisotropic behaviour of the intermolecular potential. (Atomindex citation 11:506466)

IPPJ-AM-10 PC **A09**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.

Charge Changing Cross Sections for Heavy-Particle Collisions in the Energy Range from 0.1 EV to 10 MeV. 2. Incidence of C, N, O and Their Ions.
K. Okuno. Dec 78, 183p
U.S. Sales Only.

This paper presents a compilation of the experimental works on charge changing cross sections for neutral atoms, negative- and positive-atomic ions of atomic numbers Z = 6 - 8 in collisions with atoms and simple molecules. A systematic survey of the literature has been made through October 1977. Some recent data are also included. The result is summarized in graphical forms with reference lists attached. (Atomindex citation 11:506496)

IRNE-128-1978 PC **A02**/MF **A01**
Institutul de Reactori Nucleari Energetici, Pitesti (Romania).
Thermal Analysis of Uranium Dioxide.
C. N. Turcanu, P. Georgeoni, and R. Deju. 1978, 18p
U.S. Sales Only.

The oxidation of UO sub 2 was studied by thermogravimetric and differential thermal analysis. It was verified that the physical history of the sample, together with the experimental conditions significantly influenced the oxidation steps, respectively the shapes of the TG, DTA and DTG curves, the intensity of peaks and the temperature at which the individual step occurs. (Atomindex citation 10:494088)

JEN-451 PC **A03**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Spectrographic Determination of Impurities in Magnesium Metal.
C. Capdevila, and J. P. Diaz-Guerra. 1979, 32p
In Spanish.
U.S. Sales Only.

The spectrographic determination of trace quantities of Al, B, Cd, Co, Cr, Cu, Fe, Li, Mn, Mo, Ni and Si in magnesium metal is described. Samples are disolved with HNO sub 3 and calcinated into MgO. In order to avoid losses of boron NH sub 4 OH is added to the nitric solution. Except for aluminium and chromium the analysis is performed through the use of the carrier distillation technique. These two impurities are determined by burning to completion the MgO. Among the compounds studied as carriers (AgCl, AgF, CsCl, CuF sub 2 , KCL and SrF sub 2) AgCl allows, in general, the best volatilization efficiency. Lithium determination is achieved by using KCl or CsCl. Detection limits, on the basis of MgO, are in the range 0,1 to 30 ppm, depending on the element. (Atomindex citation 11:507629)

JINR-R-10-12332 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Programming of the Man-Machine Dialog in the Calculation of the Nuclear Potential Energy as a Functional of the Nuclear Surface Shape.
A. A. Karlov, V. V. Pashkevich, and T. F. Smolyakova. 1979, 12p
In Russian.
U.S. Sales Only.

The organization of man-machine dialog in programming the calculation of the nuclear potential energy as a functional of the shape of nuclear surface is considered. The description of dialog possibilities is given, including the general control of the calculation process, representation and edition of initial data, the analysis of calculation results, performance of service functions and similar ones. The remote graphic display station based on the M-6000 minicomputer and connected with the BESM-6 central computer have been used in the man-machine dialog. (Atomindex citation 11:509324)

LA-UR-80-1619 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Picosecond Studies of Temperature and Solvent Effects on the Fluorescence from Coumarin 102 and Acridine.
S. L. Shapiro, and K. R. Winn. 1980, 7p CONF-800656-1
Contract W-7405-ENG-36
Picosecond meeting, Falmouth, MA, USA, 18 Jun 1980.

Hydrogen bonding characteristics of acridine and coumarin 102 are studied in different solutions. Coumarin 102 upon excitation forms a complex in alcoholic solutions, whereas excited acridine relaxes in aprotic and protic solvents by a process involving an activation energy. (ERA citation 05:029397)

LBL-10384 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Strain Induced Phenomena in Ca(OH) Sub 2 Made by Reaction of CaO with Water Vapor.
D. Beruto, A. W. Searcy, L. Barco, and G. Belleri. Jan 80, 6p CONF-800902-2
Contract W-7405-ENG-48
International symposium on the reactivity of solids, Cracow, Poland, 1 Sep 1980.

Three physically distinguishable, poorly crystalline forms of Ca(OH) sub 2 which are made by reactions of water vapor at 25 exp 0 C with CaO powders evolve heat and develop sharper x-ray diffraction patterns when heated to 300 exp 0 C. Measurements of x-ray diffraction peak line breadths, surface areas, porosities, and pore size distributions were made before and after heat treatment. The exothermic process of the one of these forms of Ca(OH) sub 2 which is nonporous is recrystallization of the highly strained solid to essentially unstrained crystals. The exothermic process in two porous forms of Ca(OH) sub 2 , not only reduces their internal strains, but also reduces their surface areas and porosities. (ERA citation 05:030979)

LBL-10812 PC **A06**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
XTAL System of Crystallographic Programs: Programmer's Manual.
S. R. Hall, J. M. Stewart, A. P. Norden, R. J. Munn, and S. T. Freer. Feb 80, 117p
Contract W-7405-ENG-48

This document establishes the basis for collaborative writing of transportable computer programs for x-ray crystallography. The concepts and general-purpose utility subroutines described here can be readily adapted to other scientific calculations. The complete system of crystallographic programs and subroutines is called XTAL and replaces the XRAY (6,7,8) system of programs. The coding language for the XTAL system is RATMAC (5). The XTAL system of programs contains routines for controlling execution of application programs. In this sense it forms a suboperating system that presents the same computational environment to the user and programmer irrespective of the operating system in use at a particular installation. These control routines replace all FORTRAN I/O code, supply character reading and writing, supply binary file reading and writing, serve as a support library for applications programs, and provide for interprogram communication. (ERA citation 05:029386)

LBL-10966 PC **A09**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Spontaneous and Stimulated Raman Studies of Vibrational Dephasing in Condensed Phases.
P. A. Cornelius. May 80, 185p
Contract W-7405-ENG-48
Thesis.

Vibrational dephasing in condensed phases is studied from both a theoretical and experimental standpoint. A theory is presented which describes the dynamics of motional or exchange processes in weakly perturbed systems. This general formalism, which has been previously used to describe motional narrowing in magnetic resonance, is applied to vibrational spectroscopy. The model treats the case of a high frequency vibration anharmonically coupled to a low-frequency vibration. Intermolecular exchange of low frequency vibrational quanta results in a temperature dependent broadening and frequency shift of the high frequency vibration. Analysis of experimental data by this model yields both the exchange rates and the anharmonic couplings. (ERA citation 05:029848)

MAFF-FL-16 PC **A02**/MF **A01**
Ministry of Agriculture, Fisheries and Food, Lowestoft (England). Fisheries Radiobiological Lab.
Determination of Radiocaesium in Sea and Fresh Waters.
C. W. Baker. Oct 75, 7p
U.S. Sales Only.

The caesium is adsorbed on to a cartridge of silica gel impregnated with ammonium molybdophosphate from 50 litres of filtered water, adjusted to pH 2 with nitric acid. The cartridge is then placed in a well crystal detector and gamma counted. An additional separation step is required if zirconium-95/niobium-95 contamination has occurred, as shown by gamma spectrometric analysis of the cartridge. The measurement of caesium-137 and caesium-134 is by conventional gamma -spectrometry. The output of the analysing system is ASCII paper tape, and a PDP-8 computer is used to convert this spectral information to activity of caesium-137 and -134 in pCi l exp -1 at the time of sample collection. (Atomindex citation 11:508133)

MLM-2701 PC **A03**/MF **A01**
Mound Facility, Miamisburg, OH.
FORTRAN Program for Calculating Liquid-Phase and Gas-Phase Thermal Diffusion Column Coefficients.
W. M. Rutherford. 9 Jul 80, 48p
Contract AC04-76DP00053

A computer program (COLCO) was developed for calculating thermal diffusion column coefficients from theory. The program, which is written in FORTRAN IV, can be used for both liquid-phase and gas-phase thermal diffusion columns. Column coefficients for the gas phase can be based on gas properties calculated from kinetic theory using tables of omega integrals or on tables of compiled physical properties as functions of temperature. Column coefficients for the liquid phase can be based on compiled physical property tables. Program listings, test data, sample output, and users manual are supplied for appendices. (ERA citation 05:030346)

NIIAR-14(373) PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Effect of Some Cations on Curium and Californium Separation by Extraction Chromatographic Method.
E. A. Erin, V. M. Vityutnev, V. V. Kopytov, and V. Ya. Vasil'ev. 1979, 11p
In Russian.
U.S. Sales Only.

Studies were made to elucidate the effect of iron, cobalt, chromium, nickel, titanium and zirconium on the separation and purification of curium and californium by the extraction chromatographic method, the D2EHPA being used. Extraction-chromatographic yield of both curium and californium is shown to decrease in the presence of the above cations (at their concentration of 0.01-5 g/l), the mutual purification of the above pair is worsened. The distribution of calcium, iron, cobalt, chromium, zirconium and niobium was studied in the process of extraction-chromatographic separation of curium and californium. The coefficients of curium and californium purification from the cations studied were determined. Based on the results obtained it is concluded the extraction-chromatographic method using D2EHPA may be successfully applied to curium and californium purification from cation impurities at the condition that their concentration does not exceed "threshold" values. Curium and californium separation with the mutual purification of 10 exp 2 -10 exp 3 is possible at the concentration of cation impurities of the order of 0.01 g/l. (Atomindex citation 11:507802)

NIIAR-35(394) PC **A03**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Kinetics of Uranium (4) Oxidation by Oxygen in NaCl-2CsCl Melt.
S. K. Vavilov, G. N. Kazantsev, and T. I. Sabanova. 1979, 26p
In Russian.
U.S. Sales Only.

Using the spectrophotometric method the dependence of the rate of uranium (4) oxidation by the molecular oxygen in NaCl-2CsCl melt upon the value of the specific interface, uranium (4) concentration, the partial pressure of oxygen and chlorine

the gas reagent composition and upon the temperature has been found. The kinetic scheme for the reaction in which the interaction of the molecular oxygen with chlorine anions at the melt surface is a slow phase has been proposed. (Atomindex citation 11:507835)

NPRU-78/1 PC **A06**/MF **A01**
University of the Witwatersrand, Johannesburg (South Africa). Nuclear Physics Research Unit.
Progress Report to the Nuclear Analysis Subcomittee for Nuclear Technology and Radiation for the Period 1 January 1977 to 31 December 1977.
101p
U.S. Sales Only.

This report covers the activities of the Activation Analysis Research Group (AARG) in the Nuclear Physics Research Unit of the University of the Witwatersrand. This Group has components from the Atomic Energy Board, the National Institute of Metallurgy, and receives support also from the Chamber of Mines Research Organization, the National Cancer Association, Diamond Research Laboratory and the University of the Witwatersrand. In this report the major emphasis is given to those projects carried out by the Atomic Energy Board-seconded scientific staff, but all other projects are listed with a brief note on progress, for completeness and in the interest of obviating unnecessary duplication. (Atomindex citation 09:415111)

NUREG-0678 PC **A10**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Advisory Committee on Reactor Safeguards.
The Effects of Temperature, Moisture, Concentration, Pressure and Mass Transfer on the Adsorption of Krypton and Xenon on Activated Carbon,
Dwight W. Underhill, and Dade W. Moeller. Aug 80, 204p

This report is a critical review of the published literature on the adsorption of radioactive krypton and xenon on activated charcoal. The report includes a tabulation and evaluation of the absorption coefficients for these two gases as related to temperature, pressure, moisture, mass transfer effects, and the nature of the carrier gas. Wherever possible, the resulting data have been used to develop simple correlations for quantitatively evaluating the effects of these parameters on noble gas adsorption.

N80-29461/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
A Spectroscopic Study of Intermediates in the Condensation of Refractory Smokes: Matrix Isolation Experiments SiO.
R. K. Khanna, D. D. Stranz, and D. Donn. 1980, 28p NASA-TM-81128
Grant NSG-5172

The infrared and Raman spectra of N2 matrix isolated silicon oxides are investigated. The vibrational frequencies of SiO, Si2O2, and Si3O3 were identified and assigned on the basis of normal coordinate analyses. Heating the solid to 50 K (evaporating the matrix) leaves a residue whose infrared spectrum is identical to that of a smoke condensed at ambient temperatures. Further heating of the sample to 500 K leads to significant changes in the band shapes. Investigations of the infrared spectra at several stages of the diffusion process result in the proposal of a mechanism for the transition from molecular properties to those of the residue (bulk) material, which is characterized as Si2O3.

N80-29462/2 PC **A02**/MF **A01**
Maryland Univ., College Park. Dept. of Chemistry.
Absorption and Resonance Raman Spectra of PB2, PB3 and PB4 in Xenon Matrices.
D. D. Stranz, and R. K. Khanna. 1980, 16p
NASA-CR-163428
Grant NSG-5172

Lead metal was vaporized and trapped in solid xenon at 12K. Electronic absorption and resonance Raman spectra were recorded of the resulting matrix, which was shown to contain Pb2, Pb3, and possibly Pb4 molecular species. The vibrational frequency for Pb2 is determined to be 108/cm for the ground state, with a dissociation energy of 82000/cm. Ad3h symmetry is indicated for the Pb3 species, with nu sub 1=117/cm and nu sub 2 = 96 /cm. The existence of Pb4 is suggested by a fundamental and overtone of 111/cm spacing.

N80-29463/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
The Spectral Opacity of Triatomic Carbon Measured in a Graphite Tube Furnace over the 280 to 600 NM Wavelength Range.
W. L. Snow, and W. L. Wells. Jul 80, 24p NASA-TM-81837

The opacity of linear triatomic carbon (C3) was measured in a graphite tube furnace from 280 to 600 nm to supplement the earlier measurements of Brewer and Engelke. The spectral cross section was estimated from the opacities using temperature profiles determined pyrometrically and a revised heat of formation delta H = 198 kcal/mole). The cross section was found to be nonnegligible over the range 300 to 500 nm and the electronic oscillator strength based on the total cross section estimate was 0.02.

PB80-216427 Not availble NTIS
National Bureau of Standards, Washington, DC.
Electron-Impact Ionization Cross Sections for Highly Ionized Hydrogen- and Lithium-Like Atoms.
Final rept.,
S. M. Younger. Jul 80, 7p
Pub. in Physical Review A 22, n1 p111-117 Jul 80.

Electron ionization cross sections for highly ionized atoms in the hydrogen and lithium isoelectronic sequences have been computed in several variants of the Coulomb-Born and distorted-wave approximation. Electron exchange in the transition matrix element and Coulomb distortion of the partial waves were found to be important. The results are compared to recent crossed-beam experimental data and to other theoretical predictions.

PB80-216450 Not available NTIS
National Bureau of Standards, Washington, DC.
Resonance Fluorescence and Resonance Raman Lineshapes in Strong Radiation Fields.
Final rept.,
Y. Rabin, and A. Ben-Reuven. 1980, 15p
Pub. in Jnl. Phys. B 13, n10 p2011-2025 1980.

Lineshapes of three-level resonance Raman scattering and two-level resonance fluorescence, homogeneously broadened by collisions, in the presence of arbitrarily strong coherent radiation, are studied by means of a tetradic (density-matrix) scattering theory. In particular it is shown that relaxation through intermediate non-resonant levels can considerably alter the lineshape in resonance fluorescence. In the case of strong coupling the collision rates are modified by the applied field (optical collisions). It is shown that, whereas in self attenuation spectra optical collision rates can be obtained only from line intensity or line wing measurements, in resonance scattering these rates are directly obtained from linewidth measurements.

PB80-216468 Not available NTIS
National Bureau of Standards, Washington, DC.
The Dual Melting Curves and Metastability of Carbon Tetrachloride.
Final rept.,
V. E. Bean, and S. D. Wood. 1980, 4p
Pub. in Jnl. Chem. Phys. 72, n11 p5838-5841, 1 Jun 80.

Carbon tetrachloride has three known solid phases at atmospheric pressure: Ia (face-centered cubic), Ib (rhombohedral), and II (mononucleic). Both Ia and Ib melt directly at temperatures some 5 K apart. These phase changes have been traced as a function of hydrostatic pressure up to 350 MPa. Between atmospheric pressure and 100 MPa, CCl4 has dual melting curves; one for Ia, and a few degrees higher, one for Ib. The two curves diverge with increasing pressure. Above 100 MPa it was not possible to detect the Ia phase. There appears to be no Ia-Ib-liquid triple point. The metastability associated with these phases is discussed.

PB80-216518 Not available NTIS
National Bureau of Standards, Washington, DC.
Theory of the Double Resonance Raman Amplifier.
Final rept.,
Y. Rabin, M. Berman, and A. Ben-Reuven. 1980, 10p
Pub. in Jnl. Phys. B 13, p2127-2136 1980.

A model is presented for steady-state three-level resonance Raman amplification, based on an algebraic expression for single-molecule amplification (including independently variable relaxation rates) with arbitrarily strong radiative couplings, combined with a numerical solution of non-linear equations governing macroscopic collinear propagation.

PB80-217854 PC **A03**/MF **A01**
Council for Scientific and Industrial Research, Pretoria (South Africa). Chemical Engineering Research Group.
A Fortran Computer Program for Phase Equilibria and Thermodynamic Properties Using the Benedict-Webb-Rubin Equation,
J. D. Raal, G. Jeffery, and T. G. Tonkin. Jun 80, 48p CSIR-CENG-331, ISBN-0-7988-1917-0

A robust interactive computer program has been developed for solving the eight constant Benedict-Webb-Rubin equation of state. The program requires specification of system pressure and liquid composition and predicts multicomponent vapour-liquid equilibria, liquid and vapour phase densities and enthalpy departures. For mixtures of light hydrocarbons at conditions well below critical, the difference between computed and experimental vapour mole fraction is generally less than 0.05. Computed equilibrium temperature is not consistently accurate and, in the region of the critical point, single phase systems are predicted below the mixture critical pressure. Unsatisfactory equilibrium predictions are produced for systems containing hydrogen or non-hydrocarbons. Development of an improved version using eleven constants is recommended although these constants are available only for about 20 compounds.

PB80-217987 PC **A13**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC. Systems and Measurements Div.
Collection and Interpretation of Level 1 IR and LRMS Data.
Final rept. Oct 78-Jul 80,
Alvia Gaskill, Jr., and William F. Gutknecht. Sep 80, 284p EPA-600/2-80-177
Contract EPA-68-02-2688

The report gives results of an evaluation of approaches to measurement and interpretation of infrared (IR) and low resolution mass spectra (LRMS) taken by four EPA contractors, following Level 1 environmental assessment program guidelines. The evaluation involved supplying each contractor with test spectra and samples for analysis and interpretation. Using IR, the contractors identified 55-85 percent of the structural moieties present in the various samples or indicated by the various test spectra, with 85 percent being approximately the maximum attainable. Error sources in IR measurement included analyst-to-analyst variation in signal location of + or - 5-10 wave numbers and failure to optimize signal intensity through proper loading of the salt plates or KBr pellets. IR interpretation errors disclosed were errors of omission and assignment. The contractors identified 50-90 percent of the compound classes represented using LRMS. LRMS interpretation errors disclosed were failure to find molecular ions, reporting molecular ions as fragment ions and vice versa, incorrectly identifying molecular ions, and incorrectly assigning ions to homologous series.

PB80-218506 Not available NTIS
National Bureau of Standards, Washington, DC.
Thermal Relaxation in a Liquid Under Shock Compression.
Final rept.,
D. H. Tsai, and S. F. Trevino. 1980, 3p
Pub in Proceedings of the VIIth International AIRAPT Conference, Le Creusot, France, Jul 30-Aug 3, 1979, Paper in High Pressure Science and Technology, B. Vodar and Ph. Marteau, Eds., 2, p1051-1053, Pergamon Press, Oxford, England 1980.

The authors have studied the shock compression of a dense Lennard-Jones liquid by means of detailed, molecular-dynamical calculations. The results show the structure of the shock front as well as the dynamical process of thermal relaxation behind the shock front. The shock front profiles are qualitatively similar to those obtained by Hoover who solved the Navier-Stokes equations for a continuum, and by Klimenko and Dremin who also studied the molecular dynamics of this problem. In addition, they found that thermal equilibration in the shock profile occurs at a rate lower than the propagation of the shock front itself.

PB80-218548 Not available NTIS
National Bureau of Standards, Washington, DC.
Li2 and Na2 3Sigma(g)(+)-3Sigma(u)(+) Excimer Emission.
Final rept.,
D. D. Konowalow, and P. S. Julienne. 1 Jun 80, 3p
Pub. in Jnl. of Chemical Physics 72, n11 p5815-5817, 1 Jun 80.

Ab initio calculations show the triplet Sigma(g)(+) to triplet Sigma(u)(+) in Li2 and Na2 dimers to be primarily a near-infrared continuum with respective v' = 0 lifetimes of 62 and 15 nsec. The peak stimulated emission cross sections are given. These calculations suggest a tunable high gain, near-infrared laser excimer if the triplet Sigma(g)(+) state can ge populated sufficiently rapidly.

PB80-221468 Not available NTIS
National Bureau of Standards, Washington, DC.
Measurement of Active Carbon on Ruthenium (110): Relevance to Catalytic Methanation.
Final rept.,
D. W. Goodman, and J. M. White. 1979, 3p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Surface Science 90, p201-203 1979.

A technique is described for the quantitative measurement by Auger Electron Spectroscopy (AES) of carbon on a Ru(110) surface. Previously, the detection of carbon on Ru, even qualitatively, has been difficult because of the interference between the Ru (273 eV) and C (272 eV) transitions. The lineshape of the AES feature associated with the carbon formed by heating in CO is carbidic in nature. This form of carbon is shown to be active toward hydrogenation. The specific rate of its formation in pure CO compares with the rate of methanation in a H2/CO mixture.

PB80-221476 Not available NTIS
National Bureau of Standards, Washington, DC.
A New Upper Bound for a Critical Anomaly in the Dielectric Constant of SF6.
Final rept.,
B. J. Thijsse, T. Doiron, and J. M. H. L. Sengers. 15 Jun 80, 5p
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.
Pub. in Chemical Physics Letters 72, n3 p546-550, 15 Jun 80.

The dielectric constant of SF6 on the critical isochore was measured under conditions of high thermal stability and low gravitational disturbance. No direct evidence of a t sup (1-alpha)-type anomaly was found; an upper bound for its amplitude is presented.

PB80-221484 Not available NTIS
National Bureau of Standards, Washington, DC.
Kinetics of the Hydrogenation of CO Over a Single Crystal Nickel Catalyst.
Final rept.,
D. W. Goodman, R. D. Kelley, T. E. Madey, and J. T. Yates, Jr. 1980, 9p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Jnl. of Catalysis 63, p226-234 1980.

A specially designed ultrahigh vacuum system has been used to examine the effect of surface chemical composition on the kinetics of the catalytic methanation reaction over a single crystal Ni(100) catalyst. The surface is characterized using Auger Electron Spectroscopy (AES) in an ultrahigh vacuum chamber, and reaction kinetics are determined following an in vacuo transfer of the sample to a catalytic reactor contiguous to the AES chamber. The kinetics of CO hydrogenation on a clean Ni(100) surface at 450-800 K are compared with kinetic data reported for high-area supported nickel catalysts. The dependence of the specific rate on total pressure (1-1500) and on H2 and CO partial pressures as well as the product distribution are also reported. These data are consistent with a mechanism in which an active surface carbon species is the dominant route to product.

PB80-221492 Not available NTIS
National Bureau of Standards, Washington, DC.
Measurement of Carbide Build Up and Removal Kinetics on Ni(100).
Final rept.,
D. W. Goodman, R. D. Kelley, T. E. Madey, and J. M. White. 1980, 3p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Jnl. of Catalysis Notes 64, p479-481 1980.

The rate of carbide build-up on a Ni(100) crystal is shown to be the same as the rate of methane formation in an H2 + CO mixture. Hydrogenation of a surface carbide appears to be the dominant route to product in the catalytic hydrogenation of CO over Ni catalysts.

PB80-221518 Not available NTIS
National Bureau of Standards, Washington, DC.
Electron Collisions with Polar Molecules: Exchange and Polarization in Elastic Scattering by HCl.
Final rept.,
L. A. Collins, R. J. W. Henry, and D. W. Norcross. Jun 80, 9p
Contract DOE-EA-77-A-01-6010
Sponsored in part by Office of Naval Research, Washington, DC.
Pub. in Jnl. of Physics, B: Atom. Molec. 13, n11 p2299-2307 Jun 80.

The local free-electron-gas exchange potential is shown to be not only superior to the orthogonalisation approximation to exchange, but also to yield results in good agreement with those from an essentially exact treatment of exchange. The imposition of orthogonalisation in addition to the local exchange potential yields a further small improvement in the results. The use of these two approximations in combination appears to be a promising technique. The elastic differential cross section has a strong peak in the backward direction, with important implications for resonant vibrational excitation.

PB80-221526 Not available NTIS
National Bureau of Standards, Washington, DC.
An Excited State of Acetylene: Photochemical and Spectroscopic Evidence.
Final rept.,
A. H. Laufer. 1 Jul 80, 4p
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.
Pub. in Jnl. of Chemical Physics 73, n1 p49-52, 1 Jul 80.

Absorption spectra of a long-lived transient in the 140 and 157 nm region have been observed as the result of direct excitation of C2H2. The strongest features also are seen as the result of CH2CO photolysis. The carrier is identified as C2H3. A possible alternate assignment of the transient carrier to a geometrical isomer, such as H2C=C(vinylidene) radical is discussed.

PB80-225410 Not available NTIS
National Bureau of Standards, Washington, DC.
Resonances in Atoms and Molecules.
Final rept.,
M. A. Biondi, A. Herzenberg, and A. E. Kuyatt. Oct 79, 6p
Pub. in Physics Today, p44-49 Oct 79.

The history of electron scattering resonances is reviewed, with special emphasis on the work of the late George Schulz.

PB80-227663 Not available NTIS
National Bureau of Standards, Washington, DC.
The Room Temperature Absorption of Oxygen, Hydrogen and Carbon Monoxide on (1120) Ruthenium: An Ellipsometry–LEED Characterization.
Final rept.,
J. J. Carroll, T. E. Madey, A. J. Melmed, and D. R. Sandstrom. 1980, 21p
Sponsored in part by Office of Naval Research, Washington, DC.
Pub. in Surface Science 96, p508-528 1980.

Experiments involving the room temperature adsoprtion of oxygen, hydrogen and carbon monoxide on a single crystal (1120) ruthenium surface were performed in ultra-high vacuum by monitoring the accumulation of adsorbates using ellopsometry while simultaneously observing the adsorbates' periodicity (or lack of it) with LEED. Measurements of relative carbon monoxide coverages were made using a temperature programmed desorption (flash desorption) method, and these results correlated well with coverages determined using ellipsometry.

PB80-227689 Not available NTIS
National Bureau of Standards, Washington, DC.
Intercombination Line Oscillator Strengths for the MgI Isoelectronic Sequence.
Final rept.,
C. Laughlin, and G. A. Victor. 1979, 3p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Astrophysical Jnl. 234, p407-409, 15 Nov 79.

Accurate calculations of the intercombination line oscillator strengths for the MgI isoelectronic sequence, through AR VIII, have been carried out using a semiempirical model potential method. The results differ significantly from some earlier semiempirical estimates but are in good agreement with some recent relativistic calculations.

PB80-227697 Not available NTIS
National Bureau of Standards, Washington, DC.
Absolute Cross Sections and Polarization for Electron-Impact Excitation of the Resonance Multiplet of the Be+ Ion.
Final rept.,
P. O. Taylor, R. A. Phaneuf, and G. H. Dunn. Aug 80, 10p
Contract DOE-EA-77-A-01-6010
Pub. in Physical Review A 22, n2 p435-444 Aug 80,

Crossed beams of electrons and ground state Be(+) ions have been used to measure absolute cross sections for electron-impact excitation of the 313.1-nm resonance radiation corresponding to the transition Be(+)(2p) to Be(+)(2s). Polarization fractions of the emitted light were also measured. Cross sections are absolute in the sense that all measurables including photon flux at 313 nm have been compared to relevant standards.

PB80-227705 Not available NITS
National Bureau of Standards, Washington, DC.
Absolute Photoionization Cross-Section Measurements of the Excited 4D and 5S States of Sodium.
Final rept.,
A. V. Smith, J. E. M. Goldsmith, D. E. Nitz, and S. J. Smith. Aug 80, 5p
Grant NSF-PHY76-04928
Pub. in Physical Review A 22, n2 p577-581 Aug 80.

The authors have measured the absolute cross section for photoionization of the 4D and 5S excited states of sodium for 1.06 mm radiation. The method of measurement is based on saturation of ionization probability at high intensity of the ionizing radiation. The measured cross sections for ionization of unaligned atoms are both in excellent agreement with calculated values.

PB80-851256 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Gel Permeation Chromatography. February, 1974-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Feb 74-Jun 80,
Lawrence H. Marcus. Jun 80, 212p NERACEI NT0464
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which discuss the application of gel permeation chromotography (GPC), or size exclusion chromotography, to the separation, identification, characterization, analysis and determination of molecular weights, properties and compositions of various substances, especially polymers. Methods of calibrating GPC instruments are also presented. (Contains 195 citations.)

PB80-851264 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gel Permeation Chromatography. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 62p
NERACUSGNT0464
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which discuss the application of gel permeation chromotography (GPC) to the separation, identification, characterization, analysis and determination of molecular weights, properties and compositions of various substances. Methods of calibrating GPC instruments are also presented as well as the use of GPC in conjunction with HPLL. (Contains 055 citations.)

PB80-851603 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Chelation. May, 1972-June, 1980 (Citations from the NTIS Data Base).
Rept. for May 72-Jun 80,
Howard L. Ogushwitz. Jun 80, 237p
NERACUSGNT0691
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the theory, and application of the chelation process. A discussion of the preparation of certain chelates is also included. (Contains 163 citations.)

PB80-851611 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Chelation. June, 1977-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 77-May 80,
Howard L. Ogushwitz. Jun 80, 221p
NERACEDBNT0691
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the theory, and application of the chelation process. A discussion of the preparation of certain chelates is also included. (Contains 146 citations.)

PB80-851629 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Chelation. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 100p NERACEI NT0691
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the theory, and application of the chelation process. A discussion of the preparation of certain chelates is also included. (Contains 090 citations.)

PB80-851736 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Molecular Distillation. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 70p NERACEI NT0657
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports cover information on molecular distillation or separation by molecular weight of two or more substances in a chemical compound. The different technologies applied to molecular distillation are also discussed. (Contains 110 citations.)

PB80-851744 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Molecular Distillation. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 57p NERACEDBNT0657
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports cover information on molecular distillation or separation by molecular weight of two or more substances in a chemical compound. The different technologies applied to molecular distillation are also discussed. (Contains 126 citations.)

PB80-851959 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Nuclear Magnetic Resonance of Hydrogen. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 75p NERACUSGNT0716
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the studies of hydrogen in various chemical components using nuclear magnetic resonance techniques. (Contains 066 citations.)

PB80-851967 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Nuclear Magnetic Resonance of Hydrogen. June, 1976-June, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-Jun 80,
Walter Van Put. Jun 80, 158p
NERACEDBNT0716
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the studies of hydrogen in various chemical components using nuclear magnetic resonance techniques. (Contains 150 citations.)

PB80-852502 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
High Performance Liquid Chromatography. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 143p NERACEI NT0641
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with high-performance (or high-pressure or high-speed) liquid chromatography, including discussion of equipment such as detectors, columns and stationary phases, and applications including analysis and separation of various substances, e.g., polymers, polynuclear aromatics, fatty acids and water. (Contains 114 citations.)

PB80-852510 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
High Performance Liquid Chromatography. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 123p
NERACEDBNT0641
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which deal with high-performance (or high-pressure or high-speed) liquid chromatography techniques and applications. Included are discussions of the characterization, analysis, detection and separation of various substances, such as organic materials including polycyclic aromatic compounds, water and pollutants in coal and other fuels, in wastes and in biological and biochemical systems. (Contains 100 citations.)

PB80-852528 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
High Performance Liquid Chromatography. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Lawrence H. Marcus. Jun 80, 19p
NERACIAANT0641
Sponsored in part by National Technical Information Service, Springfield, VA.

Discussed are reports on high performance liquid chromatography and its application to separation and analysis of various substances. (Contains 080 citations.)

PB80-852585 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fermentation Processes. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 79p NERACUSGNT0745
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover several principals of fermentation techniques to obtain the highest alcohol content. Various process controls of fermentation are also mentioned. (Contains 054 citations.)

PB80-852593 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fermentation Processes. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 65p NERACEI NT0745
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover several principals of fermentation techniques to obtain the highest alcohol content. Various process controls of fermentation are also mentioned. (Contains 049 citations.)

PB80-852601 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fermentation Processes. July, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jul 76-May 80,
Walter Van Put. Jun 80, 118p
NERACEDBNT0745
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover several principals of fermentation techniques to obtain the highest alcohol content. Various process controls of fermentation are also mentioned. (Contains 098 citations.)

PB80-852932 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Graphite Intercalation Compounds. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 40p
NERACEDBNT0322
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the properties, preparation, and various applications of graphite intercalation compounds and their use in the search for high conductivity compounds. (Contains 019 citations.)

PB80-853153 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Nematic Liquid Crystals. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 42p
NERACIAANT0236
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the optical properties, phase trans-

formations, chemical and physical properties, molecular structure, synthesis, applications, and testing of nematic or liquid crystals. (Contains 037 citations.)

PB80-853559 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Catalytic Recombination of Hydrogen and Oxygen. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 103p
NERACEDBNT0829
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe various processes involving the catalytic recombination of hydrogen and oxygen. Also discussed is the equipment currently available for such catalytic recombination processes. (Contains 090 citations.)

PB80-854235 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Molecular Distillation. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 22p NERACIAANT0657
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the molecular distillation, or separation by molecular weight, of two or more substances in a chemical compound. The different technologies applied to molecular distillation are also discussed. (Contains 032 citations.)

PB80-854243 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Molecular Distillation. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 45p NERACUSGNT0657
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the molecular distillation, or separation by molecular weight, of two or more substances in a chemical compound. The different technologies applied to molecular distillation are also discussed. (Contains 066 citations.)

PB80-855174 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Thermochromatography. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jul 80, 48p
NERACEDBNT0387
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited dealing with thermochromatography, especially gas thermochromatography, and its use in chemical separations, comparative evaluations and determinations of chemical properties of various substances, such as radioactive elements and isotopes, including fission products. (Contains 039 citations.)

PB80-855356 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Neoprene. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 89p NERACUSGNT0715
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on research and development and applications of neoprene used in sealers, adhesives, tires belting, clothing, solar energy, weapons, and coatings. Chemical, physical and mechanical characteristics are also included. (Contains 071 citations.)

PB80-855364 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Neoprene. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 47p NERACEI NT0715
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on research and development and applications of neoprene used in sealers, adhesives, tires belting, clothing, solar energy, weapons, and coatings. Chemical, physical and mechanical characteristics are also included. (Contains 038 citations.)

PB80-855570 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Preparation, Properties and Reactions of Transition Metal Carbonyls. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 50p NERACEI NT1318
Sponsored in part by National Technical Information Service, Springfield, VA.

These reports deal with the preparation and synthesis, properties and behavior and reactions of transition metal carbonyls. (Contains 048 citations.)

PB80-855596 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Preparation, Properties and Reactions of Transition Metal Carbonyls. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 216p
NERACUSGNT1318
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with the preparation, synthesis, properties behavior and reactions of transition metal carbonyls. Catalytic applications are also discussed. (Contains 067 citations.)

PB80-855661 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Capillary Chromatography of Foods. July, 1973-May, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jul 73-May 80,
Lawrence H. Marcus. Jun 80, 51p
NERACFSTNT0457
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which discuss the application of capillary chromatography (also referred to as capillary gas chromatography, glass capillary column chromatography, or glass capillary gas liquid chromatography) to the analysis and determination of substances (e.g. fatty acids, aroma compounds, flavorings and triglycerides) in foods. (Contains 032 citations.)

PB80-855679 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Gel Permeation Chromatography. January, 1972-May, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-May 80,
Lawrence H. Marcus. Jun 80, 66p
NERACFSTNT0464
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which discuss the application of gel permeation chromatography (GPC) to the separation, identification, and determination of compositions of various substances in foods. Use of GPC in conjunction with HPLC is also presented. (Contains 050 citations.)

PB80-855687 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Atomic Absorption Spectroscopy. September, 1976-May, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Sep 76-May 80,
Lawrence H. Marcus. Jun 80, 189p
NERACFSTNT0456
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports which deal with the techniques and application of atomic absorption spectroscopy (including flameless AAS) to the determination of and analysis of metals and trace elements in foodstuffs, such as fish, oils, dairy products, fruits, etc. Water and beverages are also investigated. (Contains 200 citations.)

PB80-855927 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Mossbauer Effect. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jul 80, 133p
NERACIAANT0246
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations contain experiments and studies done on the Mossbauer effect in various materials. Also included are descriptions of the use of the Mossbauer effect in instruments designed to analyze activation energies, surface stresses and magnetization properties. (Contains 131 citations.)

PB80-855935 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Mossbauer Effect. November, 1973-June, 1980 (Citations from the NTIS Data Base).
Rept. for Nov 73-Jun 80,
Howard L. Ogushwitz. Jul 80, 213p
NERACUSGNT0246
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations contain experiments and studies done on the Mossbauer effect in various materials. Also included are descriptions of the use of the Mossbauer effect in instruments designed to analyze activation energies, surface stresses and magnetization properties. (Contains 200 citations.)

PB80-855943 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Mossbauer Effect. July, 1972-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jul 72-Jun 80,
Howard L. Ogushwitz. Jul 80, 192p NERACEI NT0246
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations contain experiments and studies done on the Mossbauer effect in various materials. Also included are descriptions of the use of the Mossbauer effect in instruments designed to analyze activation energies, surface stresses and magnetization properties. (Contains 200 citations.)

PB80-855950 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Mossbauer Effect. October, 1978-May, 1980 (Citations from the Energy Data Base).
Rept. for Oct 78-May 80,
Howard L. Ogushwitz. Jul 80, 201p
NERACEDBNT0246
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations contain experiments and studies done on the Mossbauer effect in various materials. Also included are descriptions of the use of the Mossbauer effect in instruments designed to analyze activation energies, surface stresses and magnetization properties. (Contains 200 citations.)

PB80-855984 PC N01/MF N01
New England Research Application Center, Storrs, CT.

Antioxidants and Stabilizers for Polymers. June, 1976-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 76-Jun 80,
Lawrence H. Marcus. Jun 80, 218p NERACEI NT0923
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited from worldwide literature which discuss antioxidents and stabilizers for polymers, including protection from ultraviolet radiation, heat, light and weathering. Applications include conductor insulation, dyes and automobiles. (Contains 200 citations.)

PB80-855992 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Chemiluminescence. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 198p NERACEDBNT0936
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports covering chemiluminescence of various substances and its applications, including air pollution, lasers and testing, measuring and analytical instruments. Reactions, reaction mechanisms and reaction kinetics relating to chemiluminescence are also treated. (Contains 200 citations.)

PB80-856388 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Resonance in Reaction Kinetics. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 71p NERACEI NT1076
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the application of magnetic resonance techniques to the study of reaction kinetics and mechanisms of chemical structures. Citations include descriptions of nuclear magnetic resonance spectroscopy and analyses, kinetic studies, addition isomerism, thermolysis, pyrolysis, and polymerization techniques. (Contains 049 citations.)

PB80-856487 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Analysis of Solid Surfaces. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 93p NERACUSGNT1098
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the techniques of surface analysis for many different substances. Citations include descriptions of spectroscopic, chemical, x-ray, and ion beam techniques for characterization and microanalysis of surfaces. (Contains 085 citations.)

PB80-856495 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Analysis of Solid Surfaces. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 88p NERACEDBNT1098
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the techniques of surface analysis for many different substances. Citations include descriptions of spectroscopic, chemical, x-ray, and ion beam techniques for characterization and microanalysis of surfaces. (Contains 082 citations.)

PB80-856503 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Analysis of Solid Surfaces. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 96p NERACEI NT1098
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the techniques of surface analysis for many different substances. Citations include descriptions of spectroscopic, chemical, x-ray, and ion beam techniques for characterization and microanalysis of surfaces. (Contains 197 citations.)

PB80-856594 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Dielectric Relaxation. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jul 80, 70p NERACIAANT0252
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations listed in this bibliography discuss dielectric relaxation, dipole moments, dielectric properties of crystals and dielectric polarization of polymers. (Contains 061 citations.)

PB80-856602 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Dielectric Relaxation. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jul 80, 113p NERACUSGNT0252
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations listed in this bibliography discuss dielectric relaxation, dipole moments, dielectric properties of crystals and dielectric polarization of polymers. (Contains 101 citations.)

PB80-856610 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Dielectric Relaxation. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jul 80, 64p NERACEDBNT0252
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations listed in this bibliography discuss dielectric relaxation, dipole moments, dielectric properties of crystals and dielectric polarization of polymers. (Contains 058 citations.)

PB80-856628 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Dielectric Relaxation. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jul 80, 207p NERACEI NT0252
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations listed in this bibliography discuss dielectric relaxation, dipole moments, dielectric properties of crystals and dielectric polarization of polymers. (Contains 200 citations.)

PB80-856925 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Nematic Liquid Crystals. April, 1977-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Apr 77-Jun 80,
Howard L. Ogushwitz. Jun 80, 188p NERACEI NT0236
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the optical properties, molecular structure, synthesis, applications, and testing of nematic or liquid crystals. (Contains 200 citations.)

PB80-857956 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pollution Detection. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 105p NERACUSGNT0307
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the methods, equipment, and technology used in the detection and measurement of various types of environmental pollutants. (Contains 097 citations.)

PB80-857964 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pollution Detection. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Aug 80, 58p NERACIAANT0307
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the methods, equipment, and technology used in the detection and measurement of various types of environmental pollutants. (Contains 056 citations.)

PB80-857972 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pollution Detection. June, 1970-May, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-May 80,
William V. Sassi. Aug 80, 40p NERACEI NT0307
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the methods, equipment, and technology used in the detection and measurement of various types of environmental pollutants. (Contains 044 citations.)

PB80-857980 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pollution Detection. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 56p NERACEDBNT0307
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the methods, equipment, and technology used in the detection and measurement of various types of environmental pollutants. (Contains 44 citations.)

PB80-858400 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Chromatography for Pollution and Toxicological Analysis. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 219p NERACEI NT0396
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography cites reports which deal with the use of chromatography (mainly gas chromatography and high performance liquid chromatography) in the analysis of air and water pollutants, wastes and toxic materials. (Contains 195 citations.)

PB80-858558 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Formaldehyde. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,

John H. Frey. Jun 80, 115p NERACUSGNT0755
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the chemical and physical properties of and applicatons for formaldehyde are included in this retrospective bibliography. (Contains 078 citations.)

PB80-858566 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Formaldehyde. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 70, 57p NERACEDBNT0755
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the chemical and physical properties of and applicatons for formaldehyde are included in this retrospective bibliography. (Contains 032 citations.)

PB80-858574 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Formaldehyde. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 76p NERACEI NT0755
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the chemical and physical properties of and applicatons for formaldehyde are included in this retrospective bibliography. (Contains 057 citations.)

PB80-858640 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Chromatography for Pollution and Toxicological Analysis. November, 1976-June, 1980 (Citations from the NTIS Data Base).
Rept. for Nov 76-Jun 80,
Lawrence H. Marcus. Jun 80, 251p
NERACUSGNT0396
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography cites reports dealing with the use of chromatography (mainly gas chromatography and high performance liquid chromatography) in the analysis of air and water pollutants, wastes and toxic materials. (Contains 200 citations.)

PB80-858657 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Chromatography for Pollution and Toxicological Analysis. July, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jul 76-May 80,
Lawrence H. Marcus. Jun 80, 239p
NERACEDBNT0396
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography cites reports dealing with the use of chromatography (mainly gas chromatography and high performance liquid chromatography) in the analysis of air and water pollutants, wastes and toxic materials. (Contains 200 citations.)

PB80-859333 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Nematic Liquid Crystals. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Report period covered: Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 102p
NERACUSGNT0236
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the optical properties, phase transformations, chemical and physical properties, molecular structure, synthesis, applications, and testing of nematic or liquid crystals. (Contains 093 citations.)

PB80-859606 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Atomic Absorption Spectroscopy. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Lawrence H. Marcus. Jun 80, 39p
NERACIAANT0456
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with the techniques and application of atomic absorption spectroscopy (including flame and furnace atomic absorption spectrometry) to the determination of and analysis for metals and trace elements in various substances, such as water, coal, oils and biomedical systems, as well as others. (Contains 073 citations.)

PB80-859614 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Atomic Absorption Spectroscopy. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 200p
NERACUSGNT0456
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with the techniques and application of atomic absorption spectroscopy (including flame and furnace atomic absorption spectrometry) to the determination of and analysis for metals and trace elements in various substances, such as water, coal, oils and biomedical systems, as well as others. (Contains 200 citations.)

PB80-859622 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Atomic Absorption Spectroscopy. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 179p
NERACEDBNT0456
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with the techniques and application of atomic absorption spectroscopy (including flame and furnace atomic absorption spectrometry) to the determination of and analysis for metals and trace elements in various substances, such as water, coal, oils and biomedical systems, as well as others. (Contains 200 citations.)

PB80-859630 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Atomic Absorption Spectroscopy. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 184p NERACEI NT0456
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with the techniques and application of atomic absorption spectroscopy (including flame and furnace atomic absorption spectrometry) to the determination of and analysis for metals and trace elements in various substances, such as water, coal, oils and biomedical systems, as well as others. (Contains 200 citations.)

RISO-R-407 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Practical Experiences with Automated Radioisotope Energy-Dispersive X-Ray Fluorescence Analysis of Exploration Geochemistry Samples.
H. Kunzendorf. Jun 79, 29p
U.S. Sales Only.

Energy-dispersive X-ray fluorescence (EDX) equipment with radioisotope excitation and sample changer for the analysis of stream sediments, soils and rocks is described. Spectrum data handling and matrix corrections for the system with a exp 238 Pu source are outlined briefly. Characteristic parameters for the analytical method are evaluated. A comparison of the analyses of V, Cu, Zn and Pb in about 160 stream sediment samples with those obtained by the atomic absorption spectrophotometry (AA) is given. Reasonably good agreement between EDX and AA analyses is obtained for Cu, Zn and Pb. (Atomindex citation 11:507663)

SAND-80-6010 PC **A02**/MF **A01**
Migration Polymerization of Acrylamide under Shock-Wave Treatment.
T. N. Ignatovich, P. A. Yapol'skii, and L. M. Bragintseva. 1970, 7p
Contract AC04-76DP00789
Translated from Russian, Vysokomol. Soedin., Ser. B, 12 P506-508 1970.

On treatment of acrylamide with shock waves with amplitudes of 80 to 350 kbar, migrational polymerization with formation of poly- beta -alanine proceeds along with vinyl polymerization. This phenomenon is accompanied by changes in the IR spectra which are associated with formation of secondary amide groups and loss of the tertiary carbon atom. The detection of beta -alanine in the hydrolyzates of the samples by means of paper chromatography serves as evidence for migrational polymerization. (ERA citation 05:030999)

SAND-80-8637 PC **A02**/MF **A01**
Sandia Labs., Livermore, CA.
J Dependence of Nitrogen Q Branch Linewidths.
L. A. Rahn, A. Owyoung, M. E. Coltrin, and M. L. Koszykowski. Jun 80, 15p CONF-800808-5
Contract AC04-76DP00789
International conference on raman spectroscopy, Ottawa, Canada, 4 Aug 1980.

High resolution inverse Raman spectroscopy has been used to determine for the first time the dependence of molecular nitrogen Q branch linewidths on the rotational quantum number (J) at room temperature and at high temperatures. Preliminary quasi-classical calculations are presented which are in excellent agreement with the low temperature experimental results. (ERA citation 05:030980)

ZJE-218 PC **A03**/MF **A01**
Skoda, Plzen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren.
Thermophysical Properties of Sodium.
M. Harant. 1978, 27p
U.S. Sales Only.

Substitution, inverse and substitution inverse relations in form of regression polynomials were used in calculating saturation pressure and density for thermodynamic and transport properties determination of sodium. Program UNISOAUT/A3 was used in calculating regression polynomials coefficients. (Atomindex citation 11:507969)

7E. Radio and Radiation Chemistry

AD-A088 161/5 PC **A03**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Chemistry
n-Type Molybdenum Diselenide-Based Photoelectrochemical Cells: Evidence for Fermi Level Pinning and Comparison of the Efficiency for Conversion of Light to Electricity with Various Solvent/Halogen/Halide Combinations.
Interim technical rept.,
Lynn F. Schneemeyer, and Mark S. Wrighton. 18 Jul 80, 45p Rept no. TR-4
Contract N00014-78-C-0630

Interfacial energetics for n-type MoSe2 (E(g) = 1.4 eV, direct) and photoelectrochemical conversion of light to electrical energy in the presence of X(n)(-)/X(-) (X = Cl, Br, I) have been characterized in CH3CN electrolyte solution. Data for MoSe2 in H2O/I3(-)/I(-) are included for comparison, along with a comparison of MoSe2-based cells with MoS2- (E(g) = 1.7 eV, direct) based cells. Cyclic voltammetry for a set of reversible (at Pt electrodes) redox couples whose formal potential,

E(o), spans a range -0.8 to +1.5 V vs. SCE has been employed to establish the interface energetics of MoSe2. For the redox couples having E(o) more negative than approximately -0.1 V. vs. SCE, we find reversible electrochemistry in the dark at n-type MoSe2. When E (o) is somewhat positive of -0.1 V vs. SCE we find that oxidation of the reduced form of the redox couple can be effected in an uphill sense be irradiation of the n-type MoSe2 with = or > E(g) light; the anodic current peak is at a more negative potential than at Pt for such situations. The extent to which the photoanodic current peak is more negative than at Pt is a measure of the output photovoltage for a given couple. For E(o) more positive than approximately +0.7 V vs. SCE it would appear that this output photovoltage is constant at approximately 0.4 V. For a redox couple such as biferrocene (E(o)(BF(+)/BF = +0.3 V vs. SCE) we find a photoanodic current onset at approximately -0.2 V vs. SCE; a redox couple with E = 1.5 V vs. SCE shows an output photovoltage of 0.43 V under the same conditions.

AD-A088 507/9 PC **A02**/MF **A01**
Texas Univ At Austin Dept of Chemistry
Semiconductor Electrodes. 31. Photoelectrochemistry and Photovoltaic Systems with n- and p-Type WSe2 in Aqueous Solution.
Technical rept. 1 Sep 73-31 Aug 80,
Fu-Ren F. Fan, Henry S. White, Bob L. Wheeler, and Allen J. Bard. 2 Jan 80, 15p Rept no. TR-9
Contract N00014-78-C-0592
Pub. in Jnl. of the American Chemical Society, v102 n16 p5142-5148 1980. See also AD-A086 506.

No abstract available.

BARC-1005 PC **A06**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Radiochemistry Division Annual Progress Report for 1977.
R. H. Iyer, and P. R. Natarajan. 1979, 122p
U.S. Sales Only.

The research and development work carried by the Radiochemistry Division of the Bhabha Atomic Research Centre, Bombay, during the calendar year 1977 in the areas of reactor chemistry, actinide chemistry, process chemistry of neptunium and plutonium-239, radioanalytical chemistry and nuclear chemistry has been reported. (Atomindex citation 11:501903)

FRNC-TH-775 PC **A05**/MF **A01**
Paris-6 Univ. (France).
Part Played by Ions in Condensation Centers Formation by Gas Radiolysis.
P. Ollion. 1977, 95p
In French.Thesis.
U.S. Sales Only.

The part played by ions in the production of condensation centers by alpha or beta irradiation of a gas mixture is studied. An electrostatic device allows to change lifetime of created ions and to count the number of condensation centers produced. Experiments were carried out with air, argon, nitrogen and oxygen. The influence of impurities, sulfur dioxide or water was examined. (Atomindex citation 11:513174)

FRNC-TH-880 PC **A06**/MF **A01**
Toulouse-3 Univ. (France).
Contribution to Experimental and Theoretical Study of Radiolyais of Liquid Hydrocarbons.
C. Girouy. 1979, 106p
In French.Thesis.
U.S. Sales Only.

This work is a contribution for the study of irradiated liquid hydrocarbons. First we examine an improved experimental method with a combination of a Toepler-pump and a chromatographic apparatus for the analysis of low yields of radiolytic gases. This method is applied to the electron-scavenging rate constant determinations. A abundant part of this work deals with theoretical study of the evolution of transient ions for solvent-solute mixtures. We establish an agreement between electrical measures and the continuous or pulsed radiolysis results. In the last part we present a calculation for the formation's time of a radiolytic product and the decay of its radicalar precursor, this latter is created by electron scavenging. (Atomindex citation 11:513160)

JAERI-M-8082 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Electron Spin Resonance Study of Radicals in Irradiated Polyethylene.
T. Fujimura. Feb 79, 117p
In Japanese.
U.S. Sales Only.

In order to elucidate radiation effect in polyethylene, the nature and behavior of radicals produced in polyethylene and the model compound of polyethylene irradiated at 77 exp 0 K were studied by using electron spin resonance. The structure of radical pairs, which are composed of two radicals produced very closely each other, was investigated in drawn polyethylene and the single crystal of n-eicosane. The radical pairs of intrachain type and interchain type were found in polyethylene and n-eicosane respectively. It was suggested that these two types of radical pairs are the precursors of double bonds and crosslinks respectively. The thermal decay reactions of radicals themselves produced in irradiated polyethylene were investigated. It was made clear that the short range distances between two radicals play an important role in the decay reaction of alkyl radicals at low temperatures. The trapping regions of radicals were studied and it was clarified that allyl radicals, which are produced by the reaction of alkyl radicals with double bonds, are trapped both in the crystalline and non-crystalline regions. (Atomindex citation 11:507849)

JINR-D-1-12696 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Experimental Detection and Investigation of the Muon Catalyzed (D+T) Fusion Process.
V. M. Bystritskii, V. P. Dzhelepov, and Z. V. Ershova. 1979, 16p
U.S. Sales Only.

At the muon beam of the JINR synchrocyclotron the yield and time distribution of neutrons from fusion reaction in dt mu mesomolecule were measured in the experiments with a gaseous target filled at different pressures with purified deuterium and tritium. The experiments were set up at several tritium concentrations in the range of mixture temperatures from 93 to 613 exp 0 K. On the basis of the obtained data the low limit of the dt mu molecule formation rate lambda sub dt mu / > 10 exp 8 l/sec and the rate of muon transfer from deuterium to tritium lambda /sub dt/ = (2.7+-0.9)x10 exp 8 l/sec were defined. The defined low limit of dt mu - molecule formation rate confirms the existence, over t mu atomic energy, of a theoretically predicted resonance mechanism in the formation of this molecule. The value of transfer rate lambda /sub dt/ is likewise in good agreement with the theoretical value. (Atomindex citation 11:506438)

JINR-R-2-12355 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Analysis of Approximately alpha exp 6 Ln alpha Logarithmic Contribution from a Single Photon Exchange in Positronium.
N. A. Levchenko, N. E. Nyun'ko, Yu. N. Tyukhtyaev, and R. N. Faustov. 1979, 12p
In Russian.
U.S. Sales Only.

Within the quasipotential Logunov-Tavkhelidze approach the logarithmic contribution of alpha exp 6 in alpha order to a hyper-fine splitting of the positronium ground level obtained in a single-photon approximation is analyzed. It is shown that the results of calculations performed within the two versions of quasipotential approach coincide and are equal, i.e. delta E sub 1 (alpha exp 6 ln alpha) = 1/ 2E/sub F/ alpha exp 2 ln alpha exp -1 , where E/ sub F/ is the Fermi splitting. It allows one to improve the earlier result obtained by the other method that exceeds this contribution by a factor of two. (Atomindex citation 11:506483)

JINR-R-5-12382 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Numerical Solution of the Sturm-Liouville Problem for a System of Ordinary Differential Equations of the Second Order.
M. Kaschiev, and V. Kaschieva. 1979, 10p
In Russian.
U.S. Sales Only.

A numerical method for calculating the eigenvalues and eigenfunctions of a system of differential equations of the second order is obtained. It is shown that the solution exists under conditions that there are some constraints for equation coefficients. The difference schemes constructed are used for calculating the binding energies and corresponding wave functions of pp mu , dd mu and tt mu hydrogen mesic molecules in the adiabatic representation of the three-body problem (a two-level approximation). The numerical method of calculating binding energies near the continuous spectrum is stable. (Atomindex citation 11:506312)

JINR-6-12342 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Observation of mu exp - -Nucleon Atom of Chlorine.
V. A. Bashkirov, V. V. Govorov, and Yu. P. Dobretsov. 1979, 18p
In Russian.
U.S. Sales Only.

The results of experiment on the observation of mu exp - -nucleon chlorine atom produced in the capture of muons minus by argon atoms are described. The method of precession of the total momentum of mu exp - -nucleon atom in a weak transverse magnetic field with detecting time spectrum of mu -e-decay electron was used. The experiment was performed on the JINR meson channel, gas target (volume of 1.8 1, pressure of 46 atm.) was used simultaneously as a scintillation detector for detecting muon stops in its working volume. Experimental setup and methods of measuring are described. Lifetime of the muons minus in argon is determined (tau/sub AM/ = 571+-20 ns). (Atomindex citation 11:507507)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A088 143/3 MF **A01**
Johns Hopkins Univ Baltimore MD
Conservation of Marine Mammals.
Technical rept.,
G. Carleton Ray. 1979, 6p Rept no. TR-23
Contract N00014-75-C-0701
Pub. in Proceedings of the Alaska Science Conference (29th), p81-83 Aug 79.
Availability: Microfiche copies only.

No abstract available.

AD-A088 466/8 Not available NTIS
North Carolina Univ At Wilmington Inst of Marine Biomedical Research
Oxygen and Carbon Isotopic Growth Record in a Reef Coral from the Florida Keys and a Deep-Sea Coral from Blake Plateau,
Cesare Emiliani, J. Harold Hudson, Eugene A. Shinn, Robert Y. George, and Barbara Lidz. 1 Feb 78, 4p
Contract N00014-76-C-0216, Grant NSF-ATM75-22210
Availability: Pub. in Science, v202 p627-629, 10 Nov 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 502/0 Not available NTIS
North Carolina Univ At Wilmington Inst of Marine Biomedical Research
Behavioral and Metabolic Adaptations of Polar and Deep-Sea Crustaceans: A Hypothesis Concerning Physiological Basis for Evolution of Cold Adapted Crustaceans,
Robert Y. George. 1979, 15p
Contract N00014-76-C-0216
Abstract in Russian.
Availability: Pub. in Bulletin of the Biological Society of Washington, n3 p283-296 6 Aug 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 503/8 Not available NTIS
North Carolina Univ At Wilmington Inst of Marine Biomedical Research
What Adaptive Strategies Promote Immigration and Speciation in Deep-Sea Environment,
Robert Y. George. 16 Nov 78. 5p
Contract N00014-76-C-0216
Availability: Pub. in Sarsia v64 p61-65 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 533/5 Not available NTIS
North Carolina Univ At Wilmington Inst of Marine Biomedical Research
Eutrophic Hadal Benthic Community in the Puerto Rico Trench,
Robert Y. George, and Robert P. Higgins. 1979, 8p
Availability: Pub. in Ambio Special Report, n6 p51-58 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

BNL-27885 PC A03/MF A01
Brookhaven National Lab., Upton, NY.
Effect of Advection on Variations in Zooplankton at a Single Location Near Cabo Nazca, Peru.
S. L. Smith, K. H. Brink, H. Santander, T. J. Cowles, and A. Huyer. Apr 80, 36p CONF-800237-3
Contract AC02-76CH00016
International symposium on coastal upwelling, Los Angeles, CA, USA, 4 Feb 1980.

Temporal variations in the biomass and species composition of zooplankton at a single midshelf station in an upwelling area off Peru can be explained to a large extent by onshore-offshore advection in the upper 20 m of the water column. During periods of strong or sustained near-surface onshore flow, peaks in biomass of zooplankton were observed at midshelf and typically oceanic species of copepod were collected. In periods of offshore flow at the surface, a copepod capable of migrating into oxygen-depleted layers deeper than 30 m was collected. A simple transiocation model of advection applied to the cross-shelf distribution of Paracalanus parvus suggests that the fluctuations in P. pavus observed in the midshelf time-series were closely related to onshore-offshore flow in the upper 20 m. Fluctuations in abundance of the numerically dominant copepod, Acartia tonsa, were apparently affected by near surface flow also. The population age-structure suggests that A. tonsa was growing at maximal rates, due in part to its positive feeding response to the dinoflagellate/diatom assemblage of phytoplankton. (ERA citation 05:031152)

PB80-226756
(Order as PB80-226749, PC A15/MF A01)
National Marine Fisheries Service, Washington, DC. National Systematic Lab.
Revision of the Penaeid Shrimp Genus 'Penaeopsis' (Crustacea: Decapoda),
Isabel Perez Farfante. Jun 79, 42p NOAA-80080501-1
Included in Fishery Bulletin, v77 n4 p721-763 1980.

The genus Penaeopsis, comprising six species, is defined and its relationships discussed. Five of the species occur in the Indo-West Pacific, P. balssi, P. eduardoi, P. challengeri, P. jerryi, and P. rectacuta, and one, P. serrata, on both sides of the Atlantic.

PB80-226798
(Order as PB80-226749, PC A15/MF A01)
Institute of Oceanographic Sciences, Wormley (England).
Remarks on Systematics, Development, and Distribution of the Hatchetfish Genus 'Sternoptyx' (Pisces, Stomiatoidei),
Julian Badcock, and Ronald C. Baird. Jun 79, 17p NOAA-80080501-5
Prepared in cooperation with University of South Florida, St. Petersburg. Dept. of Marine Science.
Included in Fishery Bulletin, v77 n4 p803-820 1980.

Sternoptyx pseudodiaphana Borodulina is reported from the eastern North Atlantic in sympatry with S. diaphana, providing conclusive evidence that the former represents a species distinct from S. diaphana. Patterns of geographic variation among various characters are apparent in species of Sternoptyx as is allometric growth. These patterns render species identification difficult in certain allopatric populations, particularly those from the Atlantic and Pacific Oceans. Each species has distinct patterns of horizontal and vertical distribution and where species occur in sympatry, their centers of abundance do not coincide. Members of the genus Sternoptyx inhabit the 'lower mesopelagic depth zone' (sensu Baird) from 500 to 1,500 m. Geographic variation in depth of maximum abundance for various species can be demonstrated.

PB80-226806
(Order as PB80-226749, PC A15/MF A01)
California Univ., Santa Cruz. Center for Coastal Marine Studies.
Behavior of the Hawaiian Spinner Dolphin, 'Stenella longirostris',
Kenneth S. Norris, and Thomas P. Dohl. Jun 79, 28p NOAA-80080501-6
Included in Fishery Bulletin, v77 n4 p821-849 1980.

The Hawaiian spinner dolphin, Stenella longirostris, was recorded from Kure Atoll to the island of Hawaii. The daily cycle of spinner dolphins consists of nighttime feeding, morning approach to shore, morning-midday rest, and travel to feeding grounds near dusk.

PB80-226814
(Order as PB80-226749, PC A15/MF A01)
South Carolina Univ., Columbia. Belle W. Baruch Inst. for Marine Biology and Coastal Research.
Larval Development of 'Hypoconcha sabulosa' (Decapoda: Dromiidae),
William H. Lang, and Alan M. Young. Jun 79, 12p CONTRIB-287,, NOAA-80080501-7
Included in Fishery Bulletin, v77 n4 p851-863 1980.

Larval development of the dromiid crab, Hypoconcha sabulosa, consists of three zoeal stages and one megalopa. The zoea exhibit numerous characteristics normally associated with anomuran larvae.

PB80-226830
(Order as PB80-226749, PC A15/MF A01)
State Univ. of New York at Stony Brook. Program for Urban and Policy Sciences.
Behavior and Ecology of the Dusky Dolphin, 'Lagenorhynchus obscurus', in the South Atlantic,
Bernd Wursig, and Melany Wursig. Jul 79, 19p NOAA-80080501-9
Included in Fishery Bulletin, v77 n4 p871-890 1980.

Dusky dolphins were present in Golfo San Jose, Chubut, Argentina, during most of the year, with a seasonal low in abundance during winter and a high in summer. The presence of the prey species southern anchovy, Engraulis anchoita, appeared to affect seasonal movements. Dolphins moved in small groups of about 15 individuals while resting in early morning and while looking for food in late morning.

PB80-226848
(Order as PB80-226749, PC A15/MF A01)
Washington Univ., Seattle. Coll. of Fisheries.
Growth and Survival in Newly Settled Spat of the Manila Clam, 'Tapes japonica',
John G. Williams. May 79, 9p NOAA-80080501-10
Included in Fishery Bulletin, v77 n4 p891-900 1980.

Substrate abundances of adult Manila clam, Tapes japonica, were manipulated in July 1976 on a portion of beach dug commercially in the southern region of Puget Sound, Washington. Differences in clam spat growth and survival were measured between samples taken from substrates having varying levels of adult clam abundance. The clam spat settled at 0.206 mm long. Initial growth of clams settling in the fall was much slower than for clams settling in the summer, 9 months versus 2 months, respectively, to reach approximately 2.5 mm long.

PB80-226855
(Order as PB80-226749, PC A15/MF A01)
Oregon State Univ., Corvallis. School of Oceanography.
Development and Occurrence of Larvae and Juveniles of the Rockfishes 'Sebastes flavidus' and 'Sebastes melanops' (Scorpaenidae) Off Oregon.
Final rept.,
Wayne A. Laroche, and Sally L. Richardson. Jun 79, 23p NOAA-80080501-11
Contract NOAA-03-7-208-35263
Included in Fishery Bulletin, v77 n4 p901-924 1980.

Developmental series of larvae and juveniles of two important and very similar species of northeast Pacific rockfishes (Scorpaenidae: Sebastes) are described and illustrated: S. flavidus and S. melanops. Descriptions include a literature review, identification, distinguishing features, general development, morphology, fin development, spination, scale formation, pigmentation, and color of fresh specimens.

PB80-226871
(Order as PB80-226749, PC A15/MF A01)
University of Southern California, Los Angeles. Inst. for Marine and Coastal Studies.
Acoustic Measurements of a Migrating Layer of the Mexican Lampfish, 'Triphoturus mexicanus', at 102 Kilohertz,
R. E. Pieper, and B. G. Bargo. May 79, 7p NOAA-80080501-13
Included in Fishery Bulletin, v77 n4 p935-942 1980.

Biological sampling in a migrating scattering layer recorded at 102 kilohertz resulted in collections which consisted primarily of juvenile Triphoturus mexicanus. The scattering from this layer was quantified. Volume scattering strengths and corresponding target strengths were determined.

PB80-226889
(Order as PB80-226749, PC A15/MF A01)
State Univ. of New York at Stony Brook. Dept. of Ecology and Evolution.
Embryonic Development of Atlantic Menhaden, 'Brevoortia tyrannus', and a Fish Embryo Age Estimation Method.
Steven P. Ferraro. May 79, 6p NOAA-80080501-14
Included in Fishery Bulletin, v77 n4 p943-949 1980.

Eggs of Atlantic menhaden, Brevoortia tyrannus, were artificially fertilized and embryos were reared in the laboratory at 12 temperature-salinity combinations (temperature: 10 degrees, 15 degrees, 20 degrees, and 25 degrees C; salinity: 10, 20, 30 parts per thousand by weight). Salinity between 10 and 30 parts per thousand by weight had no significant effect on embryonic mortality and no noticeable effect on rate of development. Temperature had a significant effect on embryonic mortality and rate of development.

Group 8A—Biological Oceanography

PB80-226897 (Order as PB80-226749, PC **A15**/MF **A01**)
Naval Ocean Systems Center, San Diego, CA.
Distribution and Movements of Risso's Dolphin, 'Grampus griseus', in the Eastern North Pacific,
Stephen Leatherwood, William F. Perrin, Vicky L. Kirby, Carl L. Hubbs, and Marilyn Dahlheim. May 79, 12p NOAA-80080501-15
Prepared in cooperation with San Diego State Univ., CA. Dept. of Biology.
Included in Fishery Bulletin, v77 n4 p951-963 1980.

Records of occurrence are summarized from 22 strandings/collections and 210 sighting records from miscellaneous sources. When available, levels of effort have been identified and utilized to interpret the trends in distribution and movement apparent from the data. Risso's dolphins occur from at least the Equator (southern end of area examined) north to approximately latitude 50 degrees N, with regions of apparently very low density centering at about latitude 20 degrees and 43 degrees N.

PB80-226905 (Order as PB80-226749, PC **A15**/MF **A01**)
National Marine Fisheries Service, Miami, FL. Southeast Fisheries Center.
Description of Larval and Juvenile Red Snapper, 'Lutjanus campechanus',
L. Alan Collins, John H. Finucane, and Lyman E. Barger. May 79, 9p CONTRIB-79-32PC, NOAA-80080501-16
Included in Fishery Bulletin, v77 n4 p965-974 1980.

Identification and description of the red snapper, Lutjanus campechanus, family Lutijanidae, were based upon the general morphology, meristic characters, head spination, and pigmentation of 18 larval and 6 juvenile specimens, 4.0-22.4 mm standard length. These 24 specimens were selected from a total of 226 larval and juvenile L. campechanus which were collected mainly along the Texas coast from 1975 to 1977.

PB80-226921 (Order as PB80-226749, PC **A15**/MF **A01**)
National Marine Fisheries Service, Galveston, TX. Galveston Lab.
Trends Toward Decreasing Size of Brown Shrimp, 'Penaeus aztecus', and White Shrimp, 'Penaeus setiferus', in Reported Annual Catches from Texas and Louisiana,
Charles W. Caillouet, Frank J. Patella, and William B. Jackson. Apr 79, 4p CONTRIB-79-21G, NOAA-80080501-18
Included in Fishery Bulletin, v77 n4 p985-989 1980.

An exponential model adequately characterized the size composition (expressed as a regression of transformed cumulative percentage of weight on size category) of reported annual catches of brown and white shrimp in Texas and Louisiana from 1959 to 1976.

8B. Cartography

PB80-224033 PC **A05**/MF **A01**
Geological Survey, Reston, VA.
U.S. Geological Survey Sources of Photographs and Images of Biosphere Reserves Taken from Spacecraft and Aircraft: Fraser Experimental Forest,
Marrianne Moskowitz. 1980, 78p

Each data report in this series lists remotely sensed data gathered from spacecraft and aircraft available for a single biosphere reserve. Computer listings of data are provided by the EROS Data Center of the U.S. Geological Survey, which contains in its archives all of the listed material in photographic form and, in the case of Landsat images, can make available computer-compatible magnetic tapes of any Landsat scene.

8C. Dynamic Oceanography

AD-A088 023/7 PC **A04**/MF **A01**
Aeronautical Research Associates of Princeton Inc NJ
Solutions and the Inverse Scattering Transform.
Technical memo.,
Harvey Segur. 1980, 70p Rept no. ARAP-TM-80-6
Contracts N00014-80-C-0048, DAAG29-78-C-0003

Under appropriate conditions, ocean waves may be modeled by certain nonlinear evolution equations that admit soliton solutions and can be solved exactly by the inverse scattering transform (IST). The theory of these special equations is developed in five lectures. As physical models, these equations typically govern the evolution of narrow-band packets of small amplitude waves on a long (post-linear) time scale. This is demonstrated in Lecture I, using the Korteweg-deVries equation as an example. Lectures II and III develop the theory of IST on the infinite interval. The close connection of aspects of this theory to Fourier analysis, to canonical transformations of Hamiltonian systems, and to the theory of analytic functions is established. Typical solutions, including solitons and radiation, are discussed as well. With periodic boundary conditions, the Korteweg-deVries equation exhibits recurrence, as discussed in Lecture IV. The fifth lecture emphasizes the deep connection between evolution equations solvable by IST and Painleve transcendents, with an application to the Lorenz model. (Author)

AD-A088 069/0 PC **A13**/MF **A01**
Texas A and M Univ College Station Dept of Oceanography
The Gulf Stream Meanders Experiment, Current Meter, Atmospheric, and Sea Level Data Report for the January to May, 1979 Mooring Period.
Data rept.,
David A. Brooks, John M. Bane, Robert L. Cohen, and Paul Blankinship. Jul 80, 277p Rept no. TAMU-REF-80-7-T
Contract N00014-77-C-0354, Grant NSF-OCE79-06710
Prepared in cooperation with North Carolina Univ., Chapel Hill.

The principal objective of the Gulf Stream Meanders Experiment was to kinematically and dynamically describe the nature of meanders. The upper continental slope region off Onslow Bay, North Carolina was choosen for the experiment site because several previous investigations in that area provided a baseline data set giving some ideas about time and space variability scales within and a several-month mean view of the Stream (Webster, 1961a, b; Richardson, et al., 1969). In addition, earlier observations ranging from reports in centuries-old ship logs to recent satellite infrared imagery made it apparent that Gulf Stream meandering was more intense between Charleston and Cape Hatteras than elsewhere in the South Atlantic Bight. Current, sea level, and atmospheric data from the Gulf Stream region off North Carolina for the period January - May 1979 are documented in this data report.

AD-A088 082/3 PC **A03**/MF **A01**
Naval Research Lab Washington DC
On the Inference of Oceanic Currents or Eddies by Spaceborne Altimetry through the Dynamic Method for the Determination of Three Dimensional Density (Temperature) Field.
Memorandum rept.,
Davidson T. Chen, and Vincent E. Noble. 18 Jul 80, 33p Rept no. NRL-MR-4273
See also Rept. no. NRL-MR-4205, AD-A084 986.

The physical theoretical background, the mathematical governing equations, the absolute error, and the relative error of the dynamic method used in inferring the geostrophic current and eddy systems from the spaceborne altimeter-sensed measurements of dynamic heights or slopes have been laboriously developed. And, also, the conditions for the determination of the three dimensional density (temperature) field uniquely are mentioned and explained. The space-borne altimeter is shown to be the instrument for the provision of one condition, i.e., the ocean surface current condition. The three-dimensional density (temperature) field and its boundary conditions at the air-sea interface play dominant roles in the weather prediction and the underseas technology. The interchangeable use of the terms of density and temperature fields is valid only when the salinity can be assumed as constant.

AD-A088 329/8 PC **A08**/MF **A01**
Physical Dynamics Inc La Jolla CA
Measurement of Fluctuating Magnetic Gradients over Coastal Water: Catalog and First Analyses of Data.
Final technical rept. 1 Jan 77-31 dec 79,
Walter N. Podney, and Ronald E. Sager. Mar 80, 171p Rept no. PD-LJ-79-202
Contract N00014-77-C-0254, ARPA Order-3370

A first catalog of spectral measures of internal oscillations compiled from estimates made daily on site identifies indices that gauge comparative quality of daily measurements of fluctuating magnetic gradients. True coherence of gradiometer response with depth fluctuations of an isotherm beneath the gradiometer, a primary index of comparative quality, fluctuates about a mean value of 0.5 over the 29 days of measurements, demonstrating consistent measurement of fluctuating magnetic gradients originating from internal oscillations. On first comparison, magnetic gradients expected from Ampere's law and a linear description of seawater oscillations describe most features of statistical extimates of frequency dependence of amplitude and phase of fluctuating magnetic gradients from surface and internal oscillations. Magnetic gradients expected from surface oscillations at frequencies from 50 mHz to 200 mHz agree closely (+ or - 10%) with magnetic gradients observed from waves passing beneath the gradiometer. Magnetic gradients expected from internal oscillations of a linearly stratified layer between uniform layers at the surface and bottom give a reasonable (+ or - 25%) first description of statistical estimates of amplitude and phase of fluctuating magnetic gradients made from 6 to 9 hour long records for three of the 29 days of measurement (31 July, 5 August, and 9 August 1979). (Author)

AD-A088 465/0 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
Reprints December 1979,
Edward B. Thornton, William D. Morris, George Schaeffer, Robert T. Guza, and Vitor M. H. Goncalo. 1979, 79p Rept no. NPS-68TM79121
Pub. in various journals.

No abstract available.

AD-A088 536/8 Not available NTIS
Texas A and M Univ College Station Dept of Oceanography
The Physical Oceanography of Two Rings Observed by the Cyclonic Ring Experiment. Part II. Dynamics,
Donald B. Olson. 17 May 79, 16p
Contract N00014-75-C-0537
Availability: Pub. in Jnl. of Physical Oceanography, v10 n4 p514-528 Apr 80 (No copies furnished by DTIC/NTIS).

No abstract available.

N80-29637/9 PC **A03**/MF **A01**
Applied Science Associates, Inc., Apex, NC.
Wallops Waveform Analysis of Seasat-1 Radar Altimeter Data.
Final Report.
G. S. Hayne. Jul 80, 44p NASA-CR-156869
Contract NAS6-2810

Fitting a six parameter model waveform to over ocean experimental data from the waveform samplers in the SEASAT-1 radar altimeter is described. The fitted parameters include a waveform risetime, skewness, and track point; from these can be obtained estimates of the ocean surface significant waveheight, the surface skewness, and a correction to the altimeter's on board altitude measurement, respectively. Among the difficulties encountered are waveform sampler gains differing from

calibration mode data, and incorporating the actual SEASAT-1 sampled point target response in the fitted wave form. There are problems in using the spacecraft derived attitude angle estimates, and a different attitude estimator is developed. Points raised in this report have consequences for the SEASAT-1 radar altimeter's ocean surface measurements are for the design and calibration of radar altimeters in future oceanographic satellites.

N80-29827/6 PC A08/MF A01
Jet Propulsion Lab., Pasadena, CA.
Seasat. Volume 4: Attitude Determination.
Final Report.
A. J. Treder. 1 Jul 80, 166p NASA-CR-163943, JPL-PUB-80-38-V-4
Contract NAS7-100

The Seasat project was a feasibility demonstration of the use of orbital remote sensing for global ocean observation. The satellite was launched in June 1978 and was operated successfully until October 1978. A massive electrical failure occurred in the power system, terminating the mission prematurely. The actual implementation of the Seasat Attitude Determination system and the contents of the attitude data files generated by that system are documented. The deviations from plan caused by the anomalous Sun interference with horizon sensors, inflight calibration of Sun sensor head 2 alignment and horizon sensor biomass, estimation of yaw interpolation parameters, Sun and horizon sensor error sources, and yaw interpolation accuracy are included. Examples are given of flight attitude data from all modes of the Orbital Attitude Control System, of the ground processing effects on attitude data, and of cold cloud effects on pitch, and roll data.

8D. Geochemistry

DOE/EV/00890-T1 PC A05/MF A01
Skidaway Inst. of Oceanography, Savannah, GA.
Trace Element Geochemistry of the South Atlantic Bight. Progress Report.
H. L. Windom, and G. T. Wallace. Mar 80, 100p
Contract AS09-76EV00890

This report summarizes research conducted during the past year under DOE Contract EY-76-S-09-0890. During this time, studies have been continued in the mid to outer continental shelf region. We have also initiated nearshore studies designed to elucidate processes influencing the fate of trace elements in estuaries and the coastal frontal zone. A smaller effort has been concerned with preliminary geochemical studies of uranium-thorium natural decay series radionuclides and with improvement, calibration, and expansion of our trace element laboratory procedures. (ERA citation 05:031250)

8E. Geodesy

AD-A088 089/8 PC A03/MF A01
Naval Research Lab Washington DC
Elastic Deformations of a Rotating Spheroidal Earth Due to Surface Loads.
Final rept.,
Paolo Lanzano, and John C. Daley. 18 Jun 80, 39p Rept no. NRL-8410

We have developed a differential system of equations for representing the deformations of a rotating elastic Earth which has a spheroidal shape and which is hydrostatically prestressed. Our system is meant to represent a more sophisticated model for the Earth's load tide than the ones hereto studied because of the inclusion of rotational terms. In this study, we have assumed that the rotational axis is fixed with respect to the spheroid and that the rotational velocity is constant. We have reached a linearized version of the Navier-Stokes equations consisting of six equations which simultaneously relate three orders of harmonics. We have a boundary-value problem whose solutions must be regular functions of the radial distance in the neighborhood of the center of the configuration and which must also satisfy three other conditions at the free surface varying according to loading conditions. Numerical integration of this differential system requires the knowledge of an Earth model consisting of a density profile and of the elastic parameters as functions of the radial distance. Because of the vanishing of the rigidity, the differential system valid for the liquid outer core shrinks to a system of only four equations; discontinuity of some of the variables are to be entertained at the interfaces between the liquid outer core and the solid inner core and/or the solid mantle. We briefly discuss the proposed method of numerical solution. (Author)

AD-A088 340/5 PC A02/MF A01
Defense Mapping Agency Hydrographic/Topographic Center Washington DC
Horizontal Datums for Nautical Charts,
Thomas J. Vogel. Jul 80, 23p

Marine navigation charts are based on many and varied geodetic datums in use throughout the world. These datums range from local datums to the DoD World Geodetic System (WGS) 1972. In many cases, the datums for adjoining charts will differ, although this difference will usually introduce only minor errors into the solution of navigational problems. There are times, however, when even small errors can be very disconcerting, if not dangerous, and it is under these conditions that it is advantageous for the navigator to possess some knowledge of the factors in datum selection and chart construction which lead to apparent discrepancies in position plotting. It is equally important for the chart compiler or cartographer to understand the basic principles of navigation and, therefore, the need for establishing clearly definable horizontal datums on charts. For this reason, the author has aimed at tracing the evolution of datums on Defense Mapping Agency (DMA) nautical charts, mainly for the benefit of cartographers who must realize how the product they produce impacts on the safety of navigation in ways other than the portrayal of up-to-date information such as navigation aids, depths, etc. This paper discusses the differences between chart datums and coordinates determined by using various navigation systems, accuracy requirements for nautical charts, navigation system accuracy requirements as related to datums, and datum transformation methods. (Author)

PB80-854060 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Gravity Anomalies. September, 1974-June, 1980 (Citations from the NTIS Data Base).
Rept. for Sep 74-Jun 80,
John H. Frey. Jun 80, 86p NERACUSGNT0783
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the theory, mathematical modeling, measurement, and analysis of satellite based observations of anomalies in the earth's gravitational field (other planets and natural satellites are covered to a lesser degree) are contained in this retrospective bibliography. (Contains 200 citations.)

PB80-854078 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Gravity Anomalies. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
John H. Frey. Jun 80, 138p NERACIAANT0783
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the theory, mathematical modeling, measurement, and analysis of satellite based observations of anomalies in the earth's gravitational field (other planets and natural satellites are covered to a lesser degree) are contained in this retrospective bibliography. (Contains 140 citations.)

PB80-854292 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Gravity Measurements. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 204p NERACUSGNT0779
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the measurement and analysis of gravitational fields and waves from both ground based and satellite locations, as well as the theory for such measurements, are contained in this retrospective bibliography. (Contains 164 citations.)

PB80-854300 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Gravity Measurements. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 80p NERACEI NT0779
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the measurement and analysis of gravitational fields and waves from both ground based and satellite locations, as well as the theory for such measurements, are contained in this retrospective bibliography. (Contains 051 citations.)

PB80-854318 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Gravity Measurements. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
John H. Frey. Jun 80, 82p NERACIAANT0779
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the measurement and analysis of gravitational fields and waves from both ground based and satellite locations, as well as the theory for such measurements, are contained in this retrospective bibliography. (Contains 136 citations.)

PB80-854326 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Gravimeters. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 120p NERACUSGNT0780
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on portable gravimeters used in geodetic surveys and in geophysical prospecting and on stationary gravimeters used in geodesy are included in this retrospective bibliography. (Contains 119 citations.)

PB80-854334 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Gravimeters. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 64p NERACEI NT0780
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on portable gravimeters used in geodetic surveys and in geophysical prospecting and on stationary gravimeters used in geodesy are included in this retrospective bibliography. (Contains 061 citations.)

PB80-854342 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Gravimeters. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
John H. Frey. Jun 80, 98p NERACIAANT0780
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on portable gravimeters used in geodetic surveys and in geophysical prospecting and on stationary gravimeters used in geodesy are included in this retrospective bibliography. (Contains 078 citations.)

8G. Geology and Mineralogy

AD-A087 780/3 PC **A02**/MF **A01**
Oregon State Univ Corvallis School of Oceanography
Investigaciones Geofisicas en la Costa Oeste de la Peninsula de Baja, California (Geophysical Investigations in the Western Coast of the Peninsula of Baja, California),
Gustavo Calderon-Riveroll, and Richard Couch.
1976, 17p Rept no. 76-19
Contract N00014-67-A-0369-0007
Pub. in Latin American Meeting on Science and Technology of the Oceans, held 26 May to 1 June 1976, v2 p38-51 1976. Text in Spanish.

No abstract available.

DOE/ER/04054-4 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Fluid Transport Properties of Rock Fractures at High Pressure and Temperature. Progress Report, July 1, 1979-June 30, 1980.
T. Engelder, and C. Scholz. Apr 80, 21p
Contract AS02-76-ER04504

Flow rates and thus permeability were measured for a variety of effective pressures on artificially prepared joints in Cheshire quartzite. Permeabilities calculated from constant head tests compare with permeabilities calculated from pulse decay tests. Measurement of the change in aperture with effective pressure shows that at effective pressures of less than 20 MPa changes in confining pressure have a larger influence on the aperture than changes in pore pressure. Joint permeability changes with aperture; thus changes in confining pressure are more influential on permeability than changes in pore pressure. Although a cubic law model for flow along a joint gives a rough estimate of joint permeability, measurements of the changes in flow rate with aperture suggest that the cubic law is inadequate for smooth joints at high pressure. This is so because the effective cross section available for flow changes with pressure in a nonlinear manner. (ERA citation 05:031248)

DOE/EV-0083 PC **A12**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
State-of-the-ART of Liquid Waste Disposal for Geothermal Energy Systems: 1979. Report PNL-2404.
L. J. Defferding. Jun 80, 252p
Contract AC06-76EV01831

The state-of-the-art of geothermal liquid waste disposal is reviewed and surface and subsurface disposal methods are evaluated with respect to technical, economic, legal, and environmental factors. Three disposal techniques are currently in use at numerous geothermal sites around the world: direct discharge into surface waters; deep-well injection; and ponding for evaporation. The review shows that effluents are directly discharged into surface waters at Wairakei, New Zealand; Larderello, Italy; and Ahuachapan, El Salvador. Ponding for evaporation is employed at Cerro Prieto, Mexico. Deep-well injection is being practiced at Larderello; Ahuachapan; Otake and Hatchobaru, Japan; and at The Geysers in California. All sites except Ahuachapan (which is injecting only 30% of total plant flow) have reported difficulties with their systems. Disposal techniques used in related industries are also reviewed. The oil industry's efforts at disposal of large quantities of liquid effluents have been quite successful as long as the effluents have been treated prior to injection. This study has determined that seven liquid disposal methods - four surface and three subsurface - are viable options for use in the geothermal energy industry. However, additional research and development is needed to reduce the uncertainties and to minimize the adverse environmental impacts of disposal. (ERA citation 05:030567)

IS-T-879 PC **A05**/MF **A01**
Ames Lab., IA.
Glacial Geology of the West Tensleep Drainage Basin, Bighorn Mountains, Wyoming.
G. B. Burggraf. Aug 80, 96p
Contract W-7405-ENG-48
Thesis.

The glacial deposits of the West Tensleep Basin in the Bighorn Mountains of Wyoming are mapped and a relative chromology established. The deposits are correlated with the regional model as defined in the Wind River Mountains. A statistical analysis is performed on the density and weathering characteristics of the surficial boulders to determine their validity as indicators of relative age. (ERA citation 05:031244)

LA-UR-80-1488 PC **A02**/MF **A01**
Wesleyan Univ., Middletown, CT.
Preliminary Geological and Geophysical Evaluation of the Castle Dome HDR Geothermal Prospect, Southwestern Arizona.
J. T. Gutmann, C. L. V. Aiken, M. E. Ander, and R. T. Laney. 1980, 4p CONF-800920-3
Contract W-7405-ENG-36
Geothermal Resource Council annual meeting, Salt Lake City, UT, USA, 9 Sep 1980.

The Castle Dome HDR geothermal prospect is located in Yuma County, Arizona, in a region centered about 80 km north of Yuma along US Rte. 95. The area of interest is broadly defined by a negative residual Bouguer gravity anomaly which is about 45 km across, steep-sided in many places, and as much as 30 mgals in magnitude. The geology of this Basin and Range area is poorly known, but the few published reports and current Los Alamos Scientific Laboratory (LASL) field studies indicate that the Castle Dome Mountains and adjacent ranges are chiefly a thick pile of welded ash-flow tuffs of probable mid-Tertiary age. The tuffs rest unconformably on Mesozoic metasedimentary rocks exposed only outside steep edges of the gravity low. This gravity anomaly may reflect the presence of a large caldera. A regional magnetotelluric study now in progress will define the depths to electrical conductors within the crust and upper mantle and contribute to understanding of crustal structure, the gravity anomaly, and the Hot Dry Rock (HDR) geothermal potential of the Castle Dome area. (ERA citation 05:030555)

LA-UR-80-1688 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Low Enthalpy Convective System in Western Ohio.
M. S. Cannon, C. A. Tabet, and Y. Eckstein. 1980, 5p CONF-800920-19
Contract W-7405-ENG-36
Geothermal Resource Council annual meeting, Salt Lake City, UT, USA, 9 Sep 1980.

A distinct positive anomaly in the temperatures of the shallow (Pleistocene) aquifers along the Cincinnati-Findlay Arch in Western Ohio coincides with a low geothermal gradient. A conceptual model of convective currents associated with a tensional fault and/or fracture system along the crest of the Arch is suggested as an explanation of the anomaly. Hydrochemical information indicates that various quantities of warmer ground water, with the composition characteristics of deep bedrock aquifers, is present as an admixture in the shallow aquifers. This confirms the conceptual model of convection in fractures. (ERA citation 05:030554)

LA-8382-MS PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Compilation of Elemental Concentration Data for Fourteen Canadian Certified Reference Materials Project Standards.
E. S. Gladney. May 80, 33p
Contract W-7405-ENG-36

Elemental composition data on MRG-1, SY-2, SY-3, SO-1 implies SO-4, DH-1, DL-1, and BL-1 implies BL-5 have been collected from the open literature and certifying agency publications. Where possible, these data are summarized into mean values with standard deviations. All individual data, their uncertainties, and specific references are reported. (ERA citation 05:031251)

METC/EGSP-1 PC **A03**/MF **A01**
Pennsylvania Dept. of Environmental Resources, Harrisburg. Bureau of Topographic and Geologic Survey.
Preliminary Stratigraphic Cross Section (C1-C3) Showing Radioactive Black Shale Zones and Sandstones in the Middle and Upper Devonian, Western Pennsylvania.
R. G. Piotrowski, and S. A. Krajewski. 1979, 50p
Contract EY-76-S-05-5198

No abstract available.

METC/EGSP-2 PC **A03**/MF **A01**
Pennsylvania Dept. of Environmental Resources, Harrisburg. Bureau of Topographic and Geologic Survey.
Preliminary Stratigraphic Cross Section (A3-D3) Showing Radioactive Black Shale Zones and Sandstones in the Middle and Upper Devonian, Western Pennsylvania.
R. G. Piotrowski, and S. A. Krajewski. 1979, 40p
Contract EY-76-S-05-5198

No abstract available.

METC/EGSP-3 PC **A03**/MF **A01**
Pennsylvania Dept. of Environmental Resources, Harrisburg. Bureau of Topographic and Geologic Survey.
Preliminary Stratigraphic Cross Section (A2-D2) Showing Radioactive Black Shale Zones and Sandstones in the Middle and Upper Devonian, Western Pennsylvania.
R. G. Piotrowski, and S. A. Krajewski. 1979, 40p
Contract EY-76-S-05-5198

No abstract available.

METC/EGSP-302 PC **A05**/MF **A01**
Ohio Dept. of Natural Resources, Columbus. Div. of Geological Survey.
Net Thickness of the Radioactive Shale Facies in the Upper Olentangy Shale.
M. Honeycutt, and F. L. Majchszak. 1980, 100p
Contract AS05-76ET12131

This map represents the net thickness of the radioactive shale facies included in that part of the Olentangy Shale of Ohio which correlates to the West Falls, Sonyea, and Genesee Formations of New York State. Specifically excluded from consideration is the uppermost part of the upper Olentangy Shale which correlates to the Java Formation of New York. The net thickness of radioactive shale is determined by first establishing a normal base line for each well based upon the gamma ray log response of shale units, such as the Bedford, Chagrin, and certain units within the Olentangy, observed to be fairly consistently radioactive. Radioactive shales are then defined as those shales having a gamma ray response 20 API units or more to the right of the shale base line. The combined thickness of beds reaching the radioactive shale threshold value is reported as the net thickness of radioactive shale facies within the mapping unit. (ERA citation 05:030205)

METC/EGSP-4 PC **A03**/MF **A01**
Pennsylvania Dept. of Environmental Resources, Harrisburg. Bureau of Topographic and Geologic Survey.
Preliminary Stratigraphic Cross Section (A1-D1) Showing Radioactive Black Shale Zones and Sandstones in the Middle and Upper Devonian, Western Pennsylvania.
R. G. Piotrowski, and S. A. Krajewski. 1979, 40p
Contract EY-76-S-05-5198

No abstract available.

METC/EGSP-5 PC **A04**/MF **A01**
Pennsylvania Dept. of Environmental Resources, Harrisburg. Bureau of Topographic and Geologic Survey.
Preliminary Stratigraphic Cross Section (C4-D4) Showing Radioactive Black Shale Zones and Sandstones in the Middle and Upper Devonian, Western Pennsylvania.
R. G. Piotrowski, and S. A. Krajewski. 1979, 55p
Contract EY-76-S-05-5198

No abstract available.

PB80-854029 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gravity Surveys for Mineral Resources. June, 1975-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 75-May 80,
John H. Frey. Aug 80, 69p NERACEDBNT1270
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the methods, techniques, and application of gravity surveying for mineral resources. Also included is and analysis of the methods used in various exploration sites from around the world. (Contains 057 citations.)

PB80-854219 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tectonics. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 177p
NERACEDBNT0688
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of plate tectonics in such areas as the study of heat and mass transfer in the earth, analysis of seismic moments of earthquakes, and petroleum prospecting. (Contains 140 citations.)

PB80-854227 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tectonics. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 89p NERACEI NT0688
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of plate tectonics in such areas as the study of heat and mass transfer in the earth, analysis of seismic moments of earthquakes, and petroleum prospecting. (Contains 076 citations.)

PB80-855125 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Petroleum Geology. July, 1979-May, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jul 79-May 80,
Lawrence H. Marcus. Jul 80, 203p NERACEI NT0523
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of petroleum geology. Citations describe the geological techniques such as computer modeling, tectonics, and gamma ray spectral logging used in the prediction of oil and other hydrocarbon deposits. Also included are case analyses of various oil fields worldwide. (Contains 200 citations.)

PB80-855133 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Petroleum Geology. January, 1979-May, 1980 (Citations from the Energy Data Base).
Rept. for Jan 79-May 80,
Lawrence H. Marcus. Jul 80, 188p
NERACEDBNT0523
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of petroleum geology. Citations describe the geological techniques such as computer modeling, tectonics, and gamma ray spectral logging used in the prediction of oil and other hydrocarbon deposits. Also included are case analyses of various oil fields worldwide. (Contains 200 citations.)

PB80-855141 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Petroleum Geology. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jul 80, 110p
NERACUSGNT0523
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of petroleum geology. Citations describe the geological techniques such as computer modeling, tectonics, and gamma ray spectral logging used in the prediction of oil and other hydrocarbon deposits. Also included are case analyses of various oil fields worldwide. (Contains 103 citations.)

PB80-859804 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tectonics. October, 1973-June, 1980 (Citations from the NTIS Data Base).
Rept. for Oct 73-Jun 80,
Howard L. Ogushwitz. Jun 80, 220p
NERACUSGNT0688
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of plate tectonics in such areas as the study of heat and mass transfer in the earth, analysis of seismic moments of earthquakes, and petroleum prospecting. (Contains 182 citations.)

UCID-18586 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Laboratory Measurements of Differential Stress Using Acoustic Double Refraction.
M. S. Costantino. 1 Mar 80, 44p
Contract W-7405-ENG-48

This interim report describes the progress made in the period October 1, 1979-February 29, 1980 in evaluating Acoustic Double Refraction (ADR) as a diagnostic of in situ stress. It includes the definition of the project, a literature review, a brief discussion of the theoretical basis of the ADR effect, and an account of the hardware and software used to make the measurements. Aside from two, small, utility computer programs, the laboratory experiment is ready for its first test of signal acquisition and analysis. (ERA citation 05:031246)

USGS-474-310 PC **A05**/MF **A01**
Geological Survey, Denver, CO.
Preliminary Analysis of Physical-Properties Data Characteristics of Tunnel Beds 3 and 4 in a Part of Areas 4 and 7, Nevada Test Site.
G. E. Brethauer, D. C. Muller, and J. E. Kibler.
Jun 80, 81p
Contract AI08-76DP00474

Physical-property data for two lithologic units within the tunnel beds have been analyzed using the GRASP system (Geologic Retrieval and Synopsis Program). Quality of the data used in this study has been stringently examined. The properties show good uniformity and can be used to predict physical properties by extrapolation and interpolation for new sites, thus effecting substantial savings by reducing the collection of geologic and geophysical data. (ERA citation 05:029765)

8H. Hydrology and Limnology

AD-A088 448/6 PC **A03**/MF **A01**
Texas A and M Univ College Station Dept of Civil Engineering
Military Hydrology. Report 2. Formulation of a Long-Range Concept for Streamflow Prediction Capability.
Miscellaneous paper 1 Aug-31 Dec 79,
Wesley P. James. Jul 80, 44p WES/MP/EL-79-6-2
Contract DACA39-79-M-0143
See also rept. no. 1, AD-A081 038.

The army that has the capability of predicting streamflows throughout the battlefield area some several hours in advance should have a tactical advantage on both offense and defense. Continuous simulation of all the streams in the area would be desirable. Time, data, and manpower constraints may limit the hydrologic procedures utilized by the military hydrologist and continuous simulation of the streamflow may not be possible. This report reviews alternate procedures for predicting streamflows and presents a long-range concept for streamflow prediction capability.

CONF-800137-(Sum.) PC **A03**/MF **A01**
Harbridge House, Inc., Boston, MA.
Ground Water and Energy.
May 80, 26p
Contract W-7405-ENG-36
USDOE national workshop on ground water and energy, Albuquerque, NM, USA, 29 Jan 1980.

In view of complex environmental/energy decisions, the Environmental Impacts Division of the Office of Technology Impacts develops analytical methods for conducting policy analyses supporting decision making. The methods development process often begins with a workshop of leading experts and specialists in the relevant disciplines and issue areas; workshop findings are subsequently utilized by OTI to form a more solid foundation for viable policies. The National Workshop on Ground Water and Energy Production was envisioned as a tool through which OTI could obtain insights, information, and methods (on environmental, economical, physical, political, legal, and social issues) to use in its analyses, models, and assessments. To accomplish this, the Workshop comprised both plenary sessions and individual working groups. The former provided opportunities for all participants to explore issues from a broad perspective, whereas the latter enabled participants to focus on the three following areas: ground water supply; conflicts and barriers to its use; and alternatives or solutions to the various issues. This report summarizes information and insights gained by the Office of Technology Impacts during the course of the Workshop. The Key Findings section summarizes the most important facts discovered during the Workshop. The three general topics that follow (Supply, Conflicts and Barriers, and Alternatives) are those described in the Core Issues statements. The statements are reflective of the recommendations and analyses prepared by the several working groups. (ERA citation 05:031165)

CONF-8005101-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Interstitial Water Transport Model in Aquifer Systems by Finite Element Method.
G. T. Yeh. 1980, 18p
Contract W-7405-ENG-26
International conference on water resources development, Taipei, Taiwan, 12 May 1980.

A finite element method is described for the solution of the Richards' equation governing the groundwater flow in variably saturated porous media. The dependent vairable, the pressure head, is approximated over each isoparametric element using mixed linear, quadratic, and cubic base functions. This approximation reduces the problem to a set of matrix equations whose term associated with the temporal derivative is the mass matrix. The lumping of the mass matrix together with the application of explicit time integration schemes produces an efficient method of solution. Because of the elliptic nature of the Richards' equation in spatial dimensions, the method is very likely to yield a conditionally stable and convergent solution. Because of this property, the requirement of large computer storage for the multidimensional problem is alleviated. The model is first tested by comparing its simulation with an exact solution for a simplified case. It is then compared favorably with the experimental data. The versatility of the model is demonstrated by applying it to a hypothetical aquifer to derive the direct surface runoff, base runoff, and aquifer storage accumulation following a three-hour storm. (ERA citation 05:031243)

CONF-800567-3 PC **A02**/MF **A01**
INTERA Environmental Consultants, Inc., Houston, TX.
Behavior of Temperature and Concentration of Shallow Groundwater in the Raft River Geothermal Area.
D. H. Tang, D. Goldman, J. A. Martinez, and R. B. Lantz. 1980, 6p
Contract AC07-76ID01570
International symposia alternative energy sources and technology, Montreal, Canada, 28 May 1980.

A moderate-temperature (140 exp 0 C) geothermal power plant demonstration, sponsored by the Department of Energy, is currently under development in South Central Idaho. Environmental concerns about the quality of the local shallow ground-

water prompted a modeling study. Simulation results (1) suggest significant thermal and quality levels within the 30-year projected plant operation and (2) makes obvious the importance of understanding the interconnected hydraulic systems. (ERA citation 05:030565)

E80-10269 PC **A02**/MF **A01**
National Environmental Satellite Service, Washington, DC. Environmental Sciences Group.
Applications of HCMM Data to Soil Moisture Snow and Estuarine Current Studies.
Quarterly rept.,
Donald R. Wiesnet, David F. McGinnis, and Michael Matson. 24 Jun 80, 4p NASA-CR-163341

No abstract available.

LA-UR-80-1516 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Groundwater: Alternatives and Solutions.
F. Roach. 1980, 43p CONF-800137-1
Contract W-7405-ENG-36
USDOE national workshop on ground water and energy, Albuquerque, NM, USA, 29 Jan 1980.

Reasons for concern about water availability for the development of energy resources, especially in the Western USA, are reviewed. The use of ground water as a supplemental source, and eventually a major source of water for energy use is discussed. Examples of present use in the mining industry are given. Feasibiiity studies on the use of saline waters are discussed. The possibility of using water from deep aquifers fo energy source development is also considered. (ERA citation 05:031153)

LBL-9479 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Study of Partial Penetration in a Two-Layered Aquifer. I. Analytical Solution.
I. Javandel, and P. A. Witherspoon. May 79, 29p
Contract W-7405-ENG-48

An analytic solution is presented to the problem of transient flow to a partially penetrating well that is open in either layer of finite thickness in a two-layered system. Crossflow is permitted at the interface between the two layers. Closed form solutions have been obtained which can easily be evaluated numerically. Simplified forms of the solutions for small and large values of time have been developed from the main solution. It has also been shown that the solution reduces to the case of single layer partial penetration once we allow the permeability of the nonperforated layer to vanish. The approach here is to start with the problem when the pumping well is open only in the top layer. A second solution is also developed when the well is partially penetrating only in the lower layer. (ERA citation 05:030547)

8I. Mining Engineering

CONF-800920-16 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Results of Acid Treatments in Hydrothermal Direct Heat Experiment Wells.
J. A. Strawn. 1980, 7p
Contract AC07-76ID01570
Geothermal Resource Council annual meeting, Salt Lake City, UT, USA, 9 Sep 1980.

Matrix acid treatments have been employed in two low-to-moderate temperature hydrothermal wells with successful results. These two wells showed flow rate increases of 40% and 50%. The increased flow reduced the payback periods for the heating systems to nearly one-half of what they were before acidization. It is recommended that well designs in certain areas consider accommodating such acid stimulation techniques, if testing suggests they are warranted as a well completion tool. (ERA citation 05:030577)

DOE/BC/10003-9 PC **A04**/MF **A01**
CER Corp., Las Vegas, NV.
Western Gas Sands Project. Status Report, 1 April-30 April, 1980.
1980, 62p
Contract AC08-79BC10003

The progress of the government-sponsored projects directed towards increasing gas production from the low permeability gas sands of the western United States is summarized. Planning activities continued for the multi-well experiment. Bartlesville Energy Technology Center continued formation evaluation studies for the WGSP. Theoretical analyses continued at Lawrence Livermore Laboratory for fracture growth across frictional interfaces and fluid flow in a fracture. Studies have begun at Los Alamos Scientific Laboratory on NMR signals coming from fluids in porous media. Analyses continued of information gathered from Sandia's fracture experiment in Grayson County, Texas. Tests using the DOE Well Test Facility were completed for the Colorado Interstate Gas Company cyclic dry gas injection experiment. At the NTS, Sandia is conducting minifractures. (ERA citation 05:030203)

DOE/BC/20006-17 PC **A05**/MF **A01**
Rice Univ., Houston, TX.
Single-Well Chemical Tracer Tests Since 1968.
S. Majoros, and H. A. Deans. Jul 80, 91p
Contract AS19-79BC20006

The results of 59 single-well chemical tracer tests to measure residual oil saturation, S/sub OR/, are reported. These tests have been run by Exxon Production Research Company and its licensees since 1968 in over thirty reservoirs. The data reported are the test conditions and produced tracer concentration profiles. We have correlated the distribution coefficients and hydrolysis rate constants for the most commonly used tracers to facilitate design of future tests. (ERA citation 05:030168)

DOE/BETC/5603-10 PC **A12**/MF **A01**
University of Southern Mississippi, Hattiesburg. Dept. of Polymer Science.
Improved Polymers for Enhanced Oil Recovery Synthesis and Rheology. Second Annual Report, October 1978-September 1979.
C. L. McCormick, R. D. Hester, H. H. Neidlinger, and G. C. Wildman. Jun 80, 253p
Contract AS05-77ET12038

The status of the following studies is given: macromolecular syntheses of model polymers (homopolymer synthesis, random copolymer synthesis, graft-copolymer syntheses); macromolecular characterization by size exclusion chromatography; dilute solution studies (ageing effects on viscosity, shear rate effects on viscosity, structure effects on viscosity, turbidimetric studies); polymer solution rheological studies; macromolecular flow through controlled porous media; and polymer solution flow through simulated porous reservoirs. (ERA citation 05:030169)

DOE/ET/12056-T1 PC **A05**/MF **A01**
Stanford Univ., CA. Petroleum Research Inst.
Foam as an Agent to Reduce Gravity Override Effect During Gas Injection in Oil Reservoirs. Final Report.
J. C. Chiang, S. K. Sanyal, L. M. Castanier, W. E. Brigham, and D. O. Shah. Aug 80, 89p
Contract AC03-76ET12056

A two-dimensional, vertical, rectangular plexiglas model holding a 45-1/2 in. high by 11-3/8 in. wide by 1/4 in. thick sandpack (1.147 x 0.237 x 0.008 m) was used to investigate gravity override of injected gases in gas drive processes. Saturation of the sandpack by a surfactant solution instead of pure water sharply increased liquid recovery and breakthrough time in a nitrogen flooding process. The improvement in production was shown to be due to a reduction of gravity override caused by in-situ generation of foam at the gas-liquid interface. Solutions of two different surfactants (Suntech IX and IV) of various concentrations with different amounts of alcohol were studied to determine their effectiveness as foamers. Surface tension and rate of drainage of the foamers as functions of surfactant concentration were measured. In-situ foaming in the model increased generally with surfactant concentration until an optimum concentration was reached; above this concentration, additional amounts of surfactant had very little effect on the phenomenon. Alcohols seem to improve the performance of low molecular weight surfactants and exhibitied a negative effect on the others. A similar increase of recovery and delay in the breakthrough time was observed in the oil flooding process. A slug of surfactant solution was injected into the pack which was saturated with a white mineral oil and water at irreducible water saturation, and then nitrogen was injected. Gravity override was much less than in the cases when no surfactant was present. (ERA citation 05:030170)

DOE/ET/12088-1 PC **A15**/MF **A01**
PEDCO-Environmental, Inc., Cincinnati, OH.
Evaluation of Flue Gas Desulfurization Processes for Application to California Oil Fields.
A. N. Patkar, S. P. Kothari, and J. D. Tuttle. Apr 80, 349p
Contract ET-78-C-01-3059

This report evaluates the applicability of 12 flue gas desulfurization (FGD) processes to thermally enhanced oil recovery operations in California. Purpose is to provide information that will help the oil companies plan FGD strategies and the US DOE plan research and development projects. After reviewing current sulfur dioxide emission limitations and existing FGD systems in the California oil fields, the report discusses the design basis, equipment sizing methodology, and cost basis used in the evaluation. Intermediate-level process designs and detailed cost estimates are given for the most promising processes, and others receive some attention. The report then compares cost estimates, describes byproduct marketability, offers process selection criteria, presents bid preparation and evaluation guidelines, and makes R and D recommendations. (ERA citation 05:030196)

DOE/ET/12530-T1 PC **A09**/MF **A01**
Kaiser Steel Corp., Oakland, CA.
Demonstration of Shield-Type Longwall Supports at York Canyon Mine of Kaiser Steel Corporation. Final Technical Report A.
R. G. Lawrence, and R. King. Apr 80, 194p
Contract AC01-74ET12530

This report represents work on a program that was originated by the USBM of the Department of the Interior and was transferred to the Department of Energy on October 1, 1977. A demonstration with the Government funded Hemscheidt 320 HSL caliper type shield supports was conducted at three longwall panels of Kaiser Steel Corporation's York Canyon Mine. The purpose of this longwall demonstration was to provide the US coal industry with information on all aspects of shield longwall mining in high seams. The demonstration provided a working model for the coal industry and during the project, 350 people from the industry, schools, and government agencies visited the demonstration. They were provided with a first hand knowledge of a working shield longwall. The demonstration showed that the control of large coal lumps may be a problem in the mining of coal seam thicker than 8 feet. Mining with shield type supports provided good working conditions and a safe working environment. The shield requires very little maintenance and has a high mechanical availability. (ERA citation 05:030150)

DOE/ET/13067-60 PC **A13**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
North Burbank Unit Tertiary Recovery Pilot Test. Final Report.
J. C. Trantham. Jun 80, 281p
Contract AC19-78ET13067

During the last fifteen months of the project, fresh water injection was continued, while efforts were made to raise injection rates. Chemical analyses of fluids showed that production of surfactant components and polyacrylamide declined steadily almost to the vanishing point in all the producers. The oil production rate has declined slowly since reaching its peak level of 286 BPD in April 1978, and appears to be on an exponential decline curve which projects the continuation of tertiary oil production several years into the future. As of August 11, 1979 (expiration date), the total oil production rate was about 195 BPD at a water-oil ratio of about 66. At that time, a total of 153,500 barrels of tertiary oil had been recovered. It is predicted that 283,000 barrels of tertiary oil will be recovered if the pilot is

operated to the economic limit of the wells. This will require an additional 9 years at present rates of injection. (ERA citation 05:030171)

DOE/EV/05268-T1 PC **A07**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Feasibility Investigation and Design Study of Optical Well Logging Methods for High Temperature Geothermal Wells.
R. K. Swanson, R. E. Anderson, J. I. Ash, R. E. Beissner, and V. D. Smith. Mar 78, 131p
Contract AC05-76EV05268

The objective of this project was exploration of a novel approach to high temperature well logging, based on a system of optical transducers and an optical transmission line both theoretically capable of operation to at least 600 exp 0 C. The scope of the work involved the accomplishment of ten specific tasks. These had as their objective the determination of feasibility, and identification of major problem areas, in the implementation of continuous temperature logging of geothermal wells using optical techniques. The following tasks are reported: literature review and data compilation, measurement of fiber properties production fiber procurement, investigation of methods of fiber termination, cable design and fabrication, and sensor and system studies. (ERA citation 05:030561)

DOE/ID/12013-2 PC **A03**/MF **A01**
Wyoming Geothermal Commercialization Office, Laramie.
Geothermal Institutional Handbook for the State of Wyoming: A User's Guide of Agencies Regulations, Permits and Aids for Geothermal Development.
C. Aspinwall, J. Caplan, R. James, and K. Marcotte. May 80, 48p
Contract FC07-79ID12013

The agencies involved in geothermal development are listed and individually described. A summary of existing geothermal resource laws and their statute numbers are given followed by a discussion on the problems associated with them. The local agencies and their regulations of geothermal development are discussed. The local, state, and federal agencies directly involved in geothermal development and their permitting requirements are tabulated. Some step-by-step instructions for determining what permits are necessary for developing a specific geothermal resource are given. A list of selected references and a list of additional resources for geothermal information and referral are included. (ERA citation 05:028865)

DOE/ID/12015-2 PC **A04**/MF **A01**
Arizona Solar Energy Research Commission, Phoenix.
Arizona Geothermal Institutional Handbook: Arizona Geothermal Commercialization Planning Team, January 1-December 31, 1979.
L. Malysa. May 80, 75p
Contract AC07-76ID01570

The purpose of this handbook is to assist in understanding the various procedures and requirements necessary for the development of geothermal energy in the State of Arizona. It contains the names of key persons and agencies who are directly or indirectly involved in the institutional process. A detailed assessment of all agencies and the role they play in geothermal energy development is provided. The handbook is divided into four sections: State and Local rules and regulations, the Federal rules and regulations, references, and a technical bibliography. (ERA citation 05:028866)

DOE/RA/33211-T1 PC **A09**/MF **A01**
Energy Associates, Concord, MA.
Canadian Incentives for Oil and Gas Exploration.
Apr 80, 180p
Contract AC01-80RA33211

During the 1970s a number of different exploration and production incentive programs were put in place in Canada, in particular in the Province of Alberta, Canada's principal oil- and gas-producing province. The DOE/RA is evaluating Canadian incentives for oil and gas exploration, and this study is intended to provide information that will help guide DOE/RA in determining the applicability of Canadian incentive programs in US energy policy. The study describes and documents the fiscal structure in which the Canadian oil industry operates. The incentive features of pricing policy, taxation policy, and provincial royalty systems are discussed. A principal focus of the study is on one of the most important of Canada's specific incentive programs, the Alberta Exploratory Drilling Incentive Credit Program (EDICP). The study describes and evaluates the effect of the EDICP on increased oil and gas exploration activity. Similarly, the study also reviews and evaluates other specific incentive programs such as the Alberta Geophysical Incentive Program, Frontier Exploration Allowances, and various tar sand and heavy oil development incentives. Finally the study evaluates the applicability of Canadian incentives to US energy policy. (ERA citation 05:028379)

DOE/SF/01802-39 PC **A05**/MF **A01**
Gary Energy Corp., Englewood, CO.
Bell Creek Field Micellar-Polymer Pilot Demonstration. Third Annual Report, October 1978-September 1979.
A. Goldburg. Jul 80, 92p
Contract AC03-78SF01802

Gary Energy Corporation is conducting a DOE Demonstration Pilot to determine if micellar-polymer flooding is an economically feasible technique to enhance oil recovery from the Bell Creek Field, Powder River County, southeastern Montana. The pilot is a contained 40-acre 5-spot located in a representative watered-out portion of Unit A Reservoir. The pay is sandstone with an average net pay of 6.4 feet, air permeability of 1050 md, and water TDS of 4000 ppM. The current average remaining oil saturation in the 40-acre pilot area is estimated to be 28%. The pilot has four injectors (Wells MPP-1, MPP-2, MPP-3, and MPP-4) and one producer (Well 12-1). The overall micellar-polymer oil recovery is estimated at 47% of the remaining oil at the initiation of the micellar-polymer flood. In the third contract year (October 1978 to September 1979), all tasks including the initiation of soluble oil/micellar injection were completed. Test site development included completion of: (1) radioactive tracer survey and analysis, (2) core analysis, (3) pressure pulse tests and analysis, (4) reservoir description, and (5) test site facilities. Based on test site development data, soluble oil/micellar formulation was finalized and mathematical simulation work by Intercomp completed. The preflush injection phase of the demonstration program was completed, and the soluble oil/micellar injection was initiated at the end of the contract year. The pilot demonstration project has progressed as scheduled. (ERA citation 05:030173)

DP-MS-79-101 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Some Results of Processing NURE Geochemical Sampling in the Northern Rocky Mountain Area.
P. A. Thayer, J. R. Cook, and V. Price, Jr. 1980, 27p CONF-800593-1
Contract AC09-76SR00001
American Geological Society Rocky Mountain Section meeting, Ogden, UT, USA, 16 May 1980.

The National Uranium Resource Evaluation (NURE) program was begun in the spring of 1973 to evaluate domestic uranium resources in the continental United States and to identify areas favorable for uranium exploration. The significance of the distribution of uranium in natural waters and sediments will be assessed as an indicator of favorable areas for the discovery of uranium deposits. This paper is oriented primarily to the discussion of stream sediments. Data for the Challis 1 exp 0 x 2 exp 0 NTMS quadrangle will be used for specific samples of NURE data processing. A high-capacity neutron activation analysis facility at SRL is used to determine uranium and about 19 other elements in hydrogeochemical samples. Evaluation of the areal distributions of uranium ratios demonstrate that most of the high U/Hf, U/Th and U/(Th + Hf) ratios occur scattered throughout the western two-thirds of the quadrangle. Most of the higher ratio values are found in samples taken at sites underlain by granitic rocks of the Idaho batholith or Tertiary-age plutons. (ERA citation 05:028422)

DP-MS-79-84 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Stream Sediment Geochemical Surveys for Uranium.
V. Price, and R. B. Ferguson. 1979, 40p CONF-791156-3
Contract AC09-76SR00001
Geological Society of America annual meeting, San Diego, CA, USA, 5 Nov 1979.

Stream sediment is more universally available than ground and surface waters and comprises the bulk of NURE samples. Orientation studies conducted by the Savannah River Laboratory indicate that several mesh sizes can offer nearly equivalent information. Sediment is normally sieved in the field to pass a 420-micrometer screen (US Std. 40 mesh) and that portion of the dried sediment passing a 149-micrometer screen (US Std. 100 mesh) is recovered for analysis. Sampling densities usually vary with survey objectives and types of deposits anticipated. Principal geologic features that can be portrayed at a scale of 1:250,000, such as major tectonic units, plutons, and pegmatite districts, are readily defined using a sampling density of 1 site per 5 square miles (13 km exp 2). More detailed studies designed to define individual deposits require greater sampling density. Analyses for elements known to be associated with uranium in a particular mineral host may be used to estimate the relative proportion of uranium in several forms. For example, uranium may be associated with thorium and cerium in monazite, and with zirconium and hafnium in zircon. Readily leachable uranium may be adsorbed to trapped in oxide coatings on mineral particles. Soluble or mobile uranium may indicate an ore source, whereas uranium in monazite or zircon is not likely to be economically attractive. Various schemes may be used to estimate for form of uranium in a sample. Simple elemental ratios are a useful first approach. Multiple ratios and subtractive formulas empirically designed to account for the presence of particular minerals are more useful. Residuals calculated from computer-derived regression equations or factor scores appear to have the greatest potential for locating uranium anomalies. (ERA citation 05:028421)

FE-2468-42 PC **A03**/MF **A01**
Engineering Societies Commission on Energy, Inc., Washington, DC.
Oil Mining. Final Report, Task 014.
W. F. Reed, Jr. Jun 79, 48p
Contract EF-77-C-01-2468-014

This ESCOE task report covers the production of oil by open pit mining of oil sand deposits in the United States and surface extraction of the oil. A companion area is application of the same technology to shallow oil fields in lieu of other means of enhanced oil recovery. The report surveys possible mineable domestic sites and suggests candidates for developmental projects. Possible extraction techniques including those used in Canada, solvent extraction and retorting are discussed. It is pointed out that separation of fines and recovery of solvent are the two major extraction problems. (ERA citation 05:030207)

FE-8977-T1 PC **A07**/MF **A01**
Ultrasystems, Inc., Irvine, CA.
Investigation of Mechanics of Mine Acid Formation. Volume 1.
K. L. Paciorek, P. F. Kimble, A. L. Vatasescu, W. A. Toben, and R. H. Kratzer. Mar 80, 142p
Contract ET-78-C-01-8977

The objective of the contract was to determine, by the combination of laboratory experiments and mine samplings, the kinetics and mechanisms of the various reactions that produce mine acid drainage. To achieve this goal, primary investigations were performed utilizing pure iron disulfide in the form of pyrite and marcasite, free from coal. The effects of temperature, concentration, surface area, media nature, oxygen, presence of additional ions and bacterial action with respect to dissolution rates were measured. Thiobacillus ferrooxidans and T. thiooxidans were included in this study, both as purchased cultures and freshly isolated from mine samples. Mine samplings were performed to determine the type and quantity of bacteria present, the effect of weathering upon

coals' propensity to produce acid and other drainage, the effect of other minerals and the nature of the mine water upon ion liberation, and the effect of the different kinds of bacteria upon the above process. It was established that both pyrite and marcasite, provided sufficient surface area is exposed, will produce hydrogen, sulfate, and iron ions. This process is accelerated in the case of pyrite and marcasite by the presence of T. ferrooxidans and ferric ions. T. thiooxidans accelerates marcasite solubilization and the dissolution of iron disulfide present in coal, but had no effect on museum grade pyrite. (ERA citation 05:030142)

FE-9016-T1 PC **A15**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
Demonstration of a Steam-Powered Face Haulage Vehicle. Final Technical Report, 31 December 1978.
R. L. Demler. Jul 79, 335p
Contract ET-75-C-01-9016

This program tested and evaluated the exhaust emissions, productivity and economics of a steam engine driven coal shuttlecar. Ninety percent of United States underground coal is presently hauled with shuttlecars, typically electric cable or battery driven. Diesel shuttlecars are not widely accepted in United States coal mines because of exhaust emissions concerns despite their productivity, accident, and economic advantages over electric shuttlecars. The steam engine is attractive due to its low exhaust emissions. The steam engine tested was a modification of an automotive steam engine sponsored by the Environmental Protection Agency (EPA) and the Department of Energy (DOE). Modifications proven with a 75 hp engine include limited surface and air temperatures, exlosion proofing, flame arresting and a 22-in. high engine for the shuttlecar. Development delays, primarily in transducer reliability precluded vehicle testing within the period of performance. Sufficient testing was completed for a proof-of-principle demonstration. A new shuttlecar was completed and successfully tested with a diesel engine. The new shuttlecar concepts have been incorporated in production diesel shuttlecars. The study concludes that a steam engine driven shuttlecar is competitive with the diesel except that the first cost is higher. The steam shuttlecar appears to be superior in all respects to electric shuttlecars. Continued development of the steam engine shuttlecar is recommended if the ultimate acceptability of the diesel is in doubt. (ERA citation 05:030151)

FE-9058-1(V.1) PC **A09**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
Study of the Effect of Web Variation on the Performance of a Longwall Face. Final Technical Report, 30 November 1979.
P. J. Guay, and T. M. Hawkes. 30 Nov 79, 194p
Contract ET-77-C-01-9058

This report presents the benefits that can be derived from mining deeper webs (cuts) on a retreat longwall as practiced in the United States. The study looks at the increases in productivity (tons per shift and per annum) and the cost benefits (reduced cost per ton off the face) for a double ended ranging drum (DERD) shearer operating in the half face or modified half face mode. The gains in productivity and the cost benefits are established for web depths varying from 27 to 57 in. in a 6.5 ft seam height. The impact of wide webs on face equipment is evaluated including all currently used types of roof supports, and sizes of shearing machines. Additionally, the expected effect of wider webs on health and safety is discussed, as well as the experience that the British Mining Industry has had mining one meter (39 in.) webs. Finally, the most cost effective system of equipment is identified and specified along with the overall impact of its use on conditions of mining. (ERA citation 05:030152)

FE-9058-1(V.2) PC **A05**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
Study of the Effect of Web Variation on the Performance of a Longwall Face. Final Technical Report (Appendices), 30 November 1979.
P. J. Guay, and T. M. Hawkes. 30 Nov 79, 98p
Contract ET-77-C-01-9058

No abstract available.

GJBX-128(80) PC **E11**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Newark 1 exp 0 X 2 exp 0 NTMS Area, New Jersey, New York, and Pennsylvania. Data Report.
J. D. Heffner. Apr 80, 502p DPST-79-146-9
Contract AC13-76GJ01664

Results of ground water, stream sediment, and stream water reconnaissance in the National Topographic Map Series Newark 1 exp 0 x 2 exp 0 quadrangle are presented. Stream sediment and stream water samples were collected from small streams at 840 sites or at a nominal density of one site per 20 square kilometers in rural areas. Ground water samples were collected at 1217 sites or at a nominal density of one site per 15 square kilometers. Neutron activation analysis results are given for uranium and 16 other elements in sediments, and for uranium and 9 other elements in ground water and surface water. Field measurements and observations are reported for each site. Analytical data and field measurements are presented in tables and maps. Statistical summaries of data and a brief description of results are given. A generalized geologic map and a summary of the geology of the area are included. Key data from ground water sites include (1) water chemistry measurements (pH, conductivity, and alkalinity), (2) well depth, (3) elemental analyses (U, Br, Cl, F, Mn, Na, and V), and (4) graphical presentation only of Al and Dy analyses. Supplementary data include site descriptors (well age, frequency of use of well, etc.) and tabulated analytical data for Al and Dy. Key data from stream sediment sites include (1) water quality measurements, and (2) important elemental analyses (U, Th, Hf, Al, Ce, Fe, Mn, Sc, Na, Ti, and V). Supplementary data from stream sediment sites include sample site descriptors (stream characteristics, vegetation, etc.) and additional elemental analyses (Dy, Eu, La, Lu, Sm, and Yb). Key data from stream water sites include (1) water chemistry measurements and (2) elemental analyses (U, Al, Br, Cl, Dy, F, Mn, Na, and V). (ERA citation 05:028424)

GJBX-130(80) PC **A03**/MF **A01**
Wyoming Univ., Laramie. Dept. of Geology.
Gravimeter Studies of Shallow Structure Relating to Uranium on the Northwest Flank of the Sierra Madre, Wyoming. Final Report.
S. B. Smithson. Apr 80, 27p
Contract AC13-76GJ01664

Tertiary sedimentary rocks onlap Archean uranium-bearing conglomerates along the northwest flank of the Sierra Madre, a Precambrian cored Laramide uplift in southern Wyoming. The Archean conglomerates are a potential source of uranium but their depth beneath the Tertiary sedimentary cover is unknown. Drilling has been carried out to evaluate the economic potential of uraniferous conglomerate in the exposed Archean rocks. The conglomerates strike SW, under Tertiary rocks and one borehole was started in Tertiary rocks along the strike projection to determine depth to the conglomerate. In tracing the conglomerate beneath the sedimentary rocks and in estimating potential minable reserves, depth is critical. Depth information can be obtained by drilling, but because flatlying Tertiary sediments cover earlier features including Precambrian topography and possible faulting along the flank of the uplift, drilling the sedimentary cover could meet with geologic surprises such as faults and be expensive. Geophysical methods can also give depth information and may be economically applied before drilling in order to eliminate some of the uncertainty. (ERA citation 05:028425)

GJBX-134(79) PCE05//MF **E05**
Oak Ridge Gaseous Diffusion Plant, TN.
National Uranium Resource Evaluation Program. Hydrogeochemical and Stream Sediment Reconnaissance Basic Data for Manhattan NTMS Quadrangle, Kansas.
13 Jul 79, 224p K/UR-127
Contract W-7405-ENG-26

Results of a reconnaissance geochemical survey of the Manhattan Quadrangle, Kansas, are reported. Field and laboratory data are presented for 674 groundwater and 718 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are displayed. A generalized geologic map of the survey area is provided, and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed. The groundwater data indicate that the most promising area for potential uranium mineralization occurs in the western-northwestern part of the quadrangle where waters are produced from the Quaternary loess deposits, and the Cretaceous Greenhorn-Graneros and Dakota Formations. Associated elements in the quadrangle include arsenic, potassium, manganese, vanadium, and selenium. The stream sediment data indicate that the highest average uranium concentrations in sediments from the Manhattan Quadrangle are obtained from the Pennsylvanian Wabaunsee Group followed by the Cretaceous Carlile Shale, Greenhorn-Graneros and Dakota Formations. In the northwestern corner of the quadrangle, high concentrations of uranium are associated with high concentrations of barium, niobium, strontium, titanium, vanadium, yttrium, and zirconium. In southeast Cloud County and extending to the northeast, high values of total uranium are associated with high values of titanium, yttrium, zirconium, and low U-FL/U-NT values. These associations indicate that the uranium is probably present in heavy and/or resistate minerals. (ERA citation 05:000211)

GJBX-135(80) PC **E07**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Death Valley 1 exp 0 X 2 exp 0 NTMS Area, California and Nevada. Data Report: National Uranium Resource Evaluation Program, Hydrogeochemical and Stream Sediment Reconnaissance.
J. R. Cook. Apr 80, 311p DPST-79-146-16
Contract AC13-76GJ01664

Results of ground water and stream sediment reconnaissance in the National Topographic Map Series (NTMS) Death Valley 1 exp 0 x 2 exp 0 quadrangle are presented. Stream sediment samples were collected from small streams at 649 sites or at a nominal density of one site per 20 square kilometers. Ground water samples were collected at 62 sites or at a nominal density of one site per 220 square kilometers. Neutron activation analysis results are given for uranium and 16 other elements in sediments, and for uranium and 8 other elements in ground water and surface water. Mass spectrometry results are given for helium in ground water. Field measurements and observations are reported for each site. Analytical data and field measurements are presented in tables and maps. Statistical summaries of data and a brief description of results are given. A generalized geologic map and a summary of the geology of the area are included. Key data from ground water sites include (1) water chemistry measurements (pH, conductivity, and alkalinity), (2) scintillometer readings, and (3) elemental analyses (U, Br, Cl, F, He, Mn, Na, and V). Supplementary data include site descriptors, tabulated analytical data for Al, Dy, and Mg, and histograms and cumulative frequency plots for all elements. Key data from stream sediment sites include (1) water quality measurements (2) important elemental analyses, (U, Th, Hf, Ce, Fe, Mn, Sc, Na, Ti, and V), and (3) scintillometer readings. Supplementary data from stream sediment sites include sample site descriptors (stream characteristics, vegetation, etc.), additional elemental analyses (Dy, Eu, La, Lu, Sm, and Yb), and histograms and cumulative frequency plots for all elements. (ERA citation 05:028427)

GJBX-137(80)(V.2) PC **A04**/MF **A01**
Texas Instruments, Inc., Dallas.
Interpretation Methods Test Report for NURE Aerial Radiometric and Geochemical Data. Volume 2. Maps.
Mar 80, 66p
Contract AC13-76GJ01664

Volume 2 contains maps from the Rawlins, Denver, Spokane, and Ritzville quadrangles. (ERA citation 05:030234)

GJBX-92(79) PC **E05**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.

Hydrogeochemical and Stream Sediment Reconnaissance Basic Data for Palestine NTMS Quadrangle, Texas.
4 May 79, 202p K/UR-123
Contract EY-76-C-13-1664

Results of a reconnaissance geochemical survey of the Palestine Quadrangle are reported. Field and laboratory data are presented for 714 groundwater and 577 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are displayed. A generalized geologic map of the survey area is provided, and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed. Groundwater data indicate that uranium concentrations above the 85th percentile occur primarily in the Caddell, Wellborn, and Manning Formations of the Jackson Group; and the Yegua Formation of the Claiborne Group. Saline water trends are also prominent in these formations. Stream sediment data indicate that uranium values above the 85th percentile correlate with high concentrations of cerium, niobium, thorium, titanium, yttrium, and zirconium. This elemental suite probably indicates that uranium is associated with resistate and/or heavy minerals. (ERA citation 04:045966)

GJBX-93(79) PC **E05**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Hydrogeochemical and Stream Sediment Reconnaissance Basic Data for Wichita Falls NTMS Quadrangle, Texas.
11 May 79, 222p K/UR-124
Contract EY-76-C-13-1664

Results of a reconnaissance geochemical survey of the Wichita Falls Quadrangle, Texas are reported. Field and laboratory data are presented for 494 groundwater and 740 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are displayed. A generalized geologic map of the survey area is provided, and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed. The groundwater data indicate a promising trend for potential uranium mineralization extending from west central Baylor County through Knox and Haskell Counties to the southwest corner of the quadrangle. The main aquifer is the Permian Clear Fork Group. Related elements may indicate association of uranium with low-grade copper mineralization and possibly with oil-field fluids. Another promising area is in southern Foard County. The waters are produced from the El Reno Group and Seymour Formation. Associated elements reflect evaporite deposits. Stream sediment data indicate a promising area for possible uranium mineralization to be in the north central part of the quadrangle, north of the Wichita River in Baylor, Wilbarger, Wichita, and Foard Counties. High uranium and thorium values are scattered throughout the area. The associated elements indicate residual or heavy minerals. Another promising area is in the northwest corner of the quadrangle, which appears to be an extension of the north central area. (ERA citation 04:045967)

GJBX-95(79)(V.2)(Moab) PC **A14**/MF **A01**
GeoMetrics, Inc., Sunnyvale, CA.
Aerial gamma Ray and Magnetic Survey: Uncompahgre Uplift Project, Moab Quadrangle, Utah and Colorado. Final Report.
Apr 79, 320p
Contract EY-76-C-13-1664

Two major tectonic structures, the Uncompahgre Uplift and the Paradox Basin, occupy most of the Moab Quadrangle area. A thick sequence of Paleozoic and Mesozoic beds overlie a basement complex of Precambrian crystalline rocks in the Paradox Basin. A relatively thin sequence of Mesozoic beds overlie Precambrian rocks over the Uncompahgre Uplift. Mesozoic rocks are important with regard to both the large area they occupy (77% of the quadrangle) and their role in hosting uranium deposits. Magnetic data clearly illustrate the relative depth to the Precambrian crystalline rocks, and sharply define the boundary between the Uncompahgre Uplift and the Paradox Basin. They also indicate the probable presence of higher susceptibility intrusive bodies which have been emplaced in the Paleozoic and Mesozoic rocks of the Paradox Basin. Some of these intrusives are exposed at the surface. The Moab Quadrangle includes what has been one of the more productive uranium mining areas in the United States. Most of the deposits here are one of a variety of peneconcordant deposits which occur in sedimentary beds and which lack features commonly associated with deposits of hydrothermal origin. Such deposits are commonly believed to have formed by precipitation of uranium from circulating meteoric and/or connate water. Collectively, the Triassic Chinle Formation and the Jurassic Morrison Formation, both of stream and lakebed origin, contain most of the known uranium deposits in the quadrangle. Most of the remaining uranium deposits are scattered throughout other Mesozoic units. A relatively small number of deposits are in rocks of Permian and Pennsylvanian age. A total of 88 responses in the uranium channel constitute anomalies as defined in Volume I. (ERA citation 04:048162)

GJBX-96(79)(V.1) PC **E13**/MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: White Sulphur Springs National Topographic Map, Montana.
May 79, 223p
Contract EY-76-C-13-1664

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the White Sulphur Springs National Topographic Map NL12-5 are presented in Volume I and II of this report. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium, and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 04:048165)

IAEA-R-1564-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Study of Improved Methods of Processing Uranium Ore Using Liquid-Ion Exchangers and Resin-in-Pulp Technique. Final Report for the Period 1 December 1974 - 31 July 1977.
M. B. Zamann. Oct 78, 11p
U.S. Sales Only.

A method of separation of uranium from low-grade uranium ores is described. Long chain amines in kerosine were used as liquid ion-exchangers for the separation of uranium from acid leach liquors. For the same purpose, strong and weak anionic exchangers were also used simulating the conditions of resin-in-pulp technique. In the resin-in-pulp technique, Deacidite FF (strongly basic) and Deacidite G (weakly basic) were used. Highest distribution coefficient was obtained for Deacidite FF at a pH of 1.0. Among the various amines studied, LA-2 and tri-n-octyl amine were found to be most promising. Both showed maximum extraction efficiency at a pH of 1.3 and aqueous uranium concentration of approximately 0.5g/l. (Atomindex citation 11:507897)

IAEA-R-1620-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Use of Low-Cost Heat Sources to Improve the Efficiency of Heap Leaching of Uranium Ores. Part of a Coordinated Programme on Bacterial Leaching of Uranium Ores. Final Report for the Period 1 January 1975 - 31 May 1976.
S. Ajuria. Dec 77, 10p
U.S. Sales Only.

Basic technical parameters are given of two solar heaters designed for use in heap leaching of uranium ores. Inexpensive and easily available materials such as flat glass panes, glass tubing and corrugated metal sheets were used in the construction of the heaters. Under optimum conditions, the heaters can produce temperature differentials of 52 exp 0 C (50 exp 0 C) at the flow rate of 30ml/min. The dependence of percent recovery on the temperature of solutions in heap leaching of ore from 'El Nopal' was studied. Even though no precise correlation was found, an increase in the temperature of solutions seems to improve the efficiency of heap leaching. (Atomindex citation 11:507883)

JPL-PUB-79-122 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Economic Baselines for Current Underground Coal Mining Technology. Final Report.
W. B. Mabe. 15 Dec 79, 68p
Contract AI01-76ET12548

This report describes the calculations of the cost of mining coal using a room and pillar mining method with continuous miner and a longwall mining system. The costs were calculated for the 1975 and year 2000 time periods and are to be used as economic standards against which advanced mining concepts and systems will be compared. The calculations procedure used was generated by the NUS Corporation for the Electric Power Research Institute under contract RP 435-1. However, some assumptions were changed and some internal model-stored data were altered to obtain a result that more closely represented what was considered to be a standard mine. Coal seam thicknesses were varied from one and one-half feet to eight feet to obtain the cost of mining coal over a wide range. Geologic conditions were selected that had a minimum impact on the mining productivity. (ERA citation 05:026817)

JPL-PUBL-80-49 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Intergenerational Equity and Conservation.
R. P. O'Toole, and A. L. Walton. 15 Jun 80, 29p
Contract AI01-76ET12548

The issue of intergenerational equity in the use of natural resources is discussed in the context of coal mining conversion. More precisely, the authors attempt to determine if there is a clear-cut benefit to future generations in setting minimum coal extraction efficiency standards in mining. It is demonstrated that preserving fossil fuels beyond the economically efficient level is not necessarily beneficial to future generations even in terms of their own preferences. Setting fossil fuel conservation targets for intermediate products (i.e. energy) may increase the quantities of fossil fuels available to future generations and hence lower the costs, but there may be serious disadvantages to future generations as well. For example, the use of relatively inexpensive fossil fuels in this generation may result in more infrastructure development and more knowledge production available to future generations. The value of fossil fuels versus these other endowments in the future depends on many factors which we cannot possibly evaluate today. Thus, since we have no idea of whether we are helping or harming future generations, the authors recommend that intergenerational equity not be used as a factor in setting coal mine extraction efficiency standards, or in establishing requirements. (ERA citation 05:030154)

LA-UR-80-1485 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Monitoring and Repairing Geothermal Casing Cement: A Case History.
R. A. Pettitt. 1980, 5p CONF-800920-5
Contract W-7405-ENG-36
Geothermal Resource Council annual meeting, Salt Lake City, UT, USA, 9 Sep 1980.

A manmade geothermal reservoir has been created by drilling a deep hole into relatively impermeable hot rocks, creating a large surface area for heat transfer by hydraulic fracturing, then drilling a second hole to intersect the fracture to complete the closed circulation loop. A second generation system, presently being drilled, will entail creating multiple, parallel, vertical fractures between a pair of inclined boreholes. The original completion of injection Hole EE-1, consisting of a conventional high-temperature formulation of Class B portland cement, stabilized with 40% silica sand, did not withstand the cyclic stresses, and rapid deteriora-

tion of casing-to-cement and cement-to-formation bonds occurred, which allowed significant flow in the resulting microannulus. The performance history of the casing cement for the existing HDR EE-1 injection well, the subsequent remedial cementing program, the cement bond logs, and the radioactive isotope tracer injections tests, used to monitor the condition of the casing cement is described. (ERA citation 05:030574)

LA-UR-80-1487 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Evolution of a Hybrid Roller Cone/PDC Core Bit.
R. Pettitt, R. Laney, D. George, and G. Clemens. 1980, 5p CONF-800920-4
Contract W-7405-ENG-36
Geothermal Resource Council annual meeting, Salt Lake City, UT, USA, 9 Sep 1980.

The development of the hot dry rock (HDR) geothermal resource, as presently being accomplished by the Los Alamos Scientific Laboratory (LASL), requires that sufficient quantities of good quality core be obtained at a reasonable cost. The use of roller cone core bits, with tungsten carbide inserts, was initiated by the Deep Sea Drilling Program. These bits were modified for continental drilling in deep, hot, granitic rock for the LASL HDR Geothermal Site at Fenton Hill, New Mexico in 1974. After the advent of monocrystalline diamond Stratapax pads, a prototype hybrid roller cone/Stratapax core bit was fabricated by Smith Tool, and tested at Fenton Hill in 1978. During the drilling for a deeper HDR reservoir system in 1979 and 1980, six of the latest generation of these bits, now called Hybrid Roller Cone/Polycrystalline Diamond Cutter (PDC) core bits, were successfully used in granitic rock at depths below 11,000 ft. (ERA citation 05:030575)

LA-UR-80-1489 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Geothermal Gradient MAP of the United States.
A. Kron, and G. Heiken. 1980, 4p CONF-800920-2
Contract W-7405-ENG-36
Geothermal Resource Council annual meeting, Salt Lake City, UT, USA, 9 Sep 1980.

A geothermal gradient map is needed in order to determine the hot dry rock (HDR) geothermal resource of the United States. Based on published and unpublished data (including new measurements) the HDR program will produce updated gradient maps annually, to be used as a tool for resource evaluation and exploration. The 1980 version of this map is presented. (ERA citation 05:030556)

LA-UR-80-1639 PC **A02**/MF **A01**
D'Appolonia Consulting Engineers, Inc., Pittsburgh, PA.
Eastern Hot Dry Rock Target Prospect: A Case History.
C. E. Schubert, J. C. Maxwell, and W. J. Johnson. 1980, 5p CONF-800920-21
Contract W-7405-ENG-36
Geothermal Resource Council annual meeting, Salt Lake City, UT, USA, 9 Sep 1980.

The Eastern Hot Dry Rock Target Prospect is located in a corridor between Smith Island, Maryland on Chesapeake Bay and the southern tip of Assateague Island, Virginia on the Atlantic Ocean. The prospect was selected for investigation based on anomalously high heat flow values and thermal gradients previously determined. The exploration program was aimed at locating the most favorable location within the site area for the targeting of a deep test borehole for HDR heat extraction. The program consisted of an aeromagnetic survey, gravity/magnetic analysis, time-domain electromagnetic (TDEM) survey, Vibroseis seismic reflection profiling, drilling and logging of four 300-meter borings, and the reopening and logging of an abandoned oil exploration hole. The preliminary results of this nearly completed study indicate that the area has potential for the extraction of heat using the Hot Dry Rock concept. (ERA citation 05:030557)

LA-UR-80-1825 PC **A02**/MF **A01**
Maurer Engineering, Inc., Houston, TX.
Geothermal Well Stimulation.
A. R. Sinclair, F. J. Pittard, and R. J. Hanold. 1980, 5p CONF-800920-18
Contract W-7405-ENG-36
Geothermal Resource Council annual meeting, Salt Lake City, UT, USA, 9 Sep 1980.

All available data on proppants and fluids were examined to determine areas in technology that need development for 300 to 500 exp 0 F (150 exp 0 to 265 exp 0 C) hydrothermal wells. While fluid properties have been examined well into the 450 exp 0 F range, proppants have not been previously tested at elevated temperatures except in a few instances. The latest test data at geothermal temperatures is presented and some possible proppants and fluid systems that can be used are shown. Also discussed are alternative stimulation techniques for geothermal wells. (ERA citation 05:030578)

LA-UR-80-2138 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Large Scale Meteorological Influence During the Geysers 1979 Field Experiment.
S. Barr. 1980, 15p CONF-800480-5
Contract W-7405-ENG-36
ASCOT program planning meeting, Gettysburg, PA, USA, 15 Apr 1980.

A series of meteorological field measurements conducted during July 1979 near Cobb Mountain in Northern California reveals evidence of several scales of atmospheric circulation consistent with the climatic pattern of the area. The scales of influence are reflected in the structure of wind and temperature in vertically stratified layers at a given observation site. Large scale synoptic gradient flow dominates the wind field above about twice the height of the topographic ridge. Below that there is a mixture of effects with evidence of a diurnal sea breeze influence and a sublayer of katabatic winds. The July observations demonstrate that weak migratory circulations in the large scale synoptic meteorological pattern have a significant influence on the day-to-day gradient winds and must be accounted for in planning meteorological programs including tracer experiments. (ERA citation 05:031113)

LBL-10837 PC **A10**/MF **A01**
Golder Associates, Inc., Seattle, WA.
Detailed Report on Tested Models Companion Report 2 to Simulation of Geothermal Subsidence (LBL 10571).
I. Miller, W. Dershowitz, K. Jones, L. Myer, and K. Roman. Mar 80, 206p
Contract W-7405-ENG-48

An assessment was performed of existing mathematical models for subsidence simulation and prediction. Detailed analyses are presented of the theory, power, usability, and performance of the seven models used in conjunction with an ongoing research program aimed at improved understanding and control of ground movements caused by geothermal power production. The models used were: hand-calculation techniques; the nucleus-of-strain method; the one-dimensional Terzaghi consolidation method; the two-dimensional boundary-integral-equation method; two-dimensional finite-element coupled fluid flow and deformation; three-dimensional integrated finite difference, coupled fluid flow, heat flow, and porosity change; and the three-dimensional displacement discontinuity method. (ERA citation 05:030568)

LBL-10983 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Injection into a Fractured Geothermal Reservoir.
G. S. Bodvarsson, and C. F. Tsang. May 80, 5p CONF-800920-23
Contract W-7405-ENG-48
Geothermal Resource Council annual meeting, Salt Lake City, UT, USA, 9 Sep 1980.

A detailed study is made on the movement of the thermal fronts in the fracture and in the porous medium when 100 exp 0 C water is injected into a 300 exp 0 C geothermal reservoir with equally spaced horizontal fractures. Numerical modeling calculations were made for a number of thermal conductivity values, as well as different values of the ratio of fracture and rock medium permeabilities. One important result is an indication that although initially, the thermal front in the fracture moves very fast relative to the front in the porous medium as commonly expected, its speed rapidly decreases. At some distance from the injection well the thermal fronts in the fracture and the porous medium coincide, and from that point they advance together. The implication of this result on the effects of fractures on reinjection into geothermal reservoirs is discussed. (ERA citation 05:030569)

LBL-10987 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Comparison of Dipole-Dipole Resistivity and Electromagnetic Induction Sounding over the Panther Canyon Thermal Anomaly, Grass Valley, Nevada.
M. Wilt, J. H. Beyer, and N. E. Goldstein. May 80, 5p CONF-800920-7
Contract W-7405-ENG-48
Geothermal Resource Council annual meeting, Salt Lake City, UT, USA, 9 Sep 1980.

A comparison is made between the dipole-dipole resistivity method and electromagnetic sounding method based on surveys over a geothermal anomaly near Panther Canyon, Grass Valley, Nevada. Dipole-dipole data were taken in conjunction with large-scale geothermal studies in the area. Two orthogonal lines were measured over the heat flow anomaly and two-dimensional modeling was performed on the data. EM sounding data were taken with the Lawrence Berkeley Laboratory EM-60 system which is a large-moment, frequency-domain, horizontal-loop system. Relative to single 50-meter-radius transmitter coil, eight soundings were made with detectors at distances of 0.5 to 1.6 km from the loop. Interpreted results from the two surveys indicate substantial agreement in the depth to and thickness of a conductive zone that may be associated with the thermal anomaly. The dipole-dipole method is inherently better for resolving resistive basement beneath the conductive anomaly, and dc resistivity interpretation techniques are presently better to handle the complex two-dimensional geology. However, the EM method is far less labor intensive, requiring only one-third the field time for similar areal coverage. (ERA citation 05:030558)

ORNL/SUB-79/45724/1 PC **A11**/MF **A01**
Bechtel National, Inc., San Francisco, CA.
Conceptual Flow Sheets Development for Coal Conversion Plant Coal Handling-Preparation and Ash/Slag Removal Operations.
Jul 79, 236p
Contract W-7405-ENG-26

This report presents 14 conceptual flow sheets and major equipment lists for coal handling and preparation operations that could be required for future, commercial coal conversion plants. These flow sheets are based on converting 50,000 tons per day of clean coal representative of the Pittsburgh and Kentucky No. 9 coal seams. Flow sheets were used by Union Carbide Corporation, Oak Ridge National Laboratory, in a survey of coal handling/preparation equipment requirements for future coal conversion plants. Operations covered in this report include run-of-mine coal breaking, coarse coal cleaning, fine coal cleaning, live storage and blending, fine crushing (crushing to top sizes ranging from 1/4-inch to 20 mesh), drying, and grinding (70 percent minus 200 mesh). Two conceptual flow sheets and major equipment lists are also presented for handling ash or granulated slag and other solid wastes produced by nine leading coal conversion processes. These flow sheets provide for solid wastes transport to an environmentally acceptable disposal site as either dry solids or as a water slurry. (ERA citation 05:030157)

PB80-218829 PC **A03**/MF **A01**
Brown (Robert) Associates, Carson, CA.
Flared Gas Conservation.
Final rept.,
Donald M. Gammell, John H. Williams, and Sheldon Krueger. Jul 79, 40p GRI-78/0012
Contract GRI-5011-342-0106

The purpose of this study was to (1) identify the flared and vented gas sources at major field facilities, on leases and at gas processing plants, (2)

quantify the amount of gas lost and categorize by type of source, (3) identify the conservation practices that could be reduced, and (4) identify the uses to which such flared gas might be economically applied.

PB80-219181 PC **A03**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Overview of Research and Development Activities in Unconventional Natural Gas Recovery.
Final rept.
Aug 78, 41p GRI-78/0001
Contract GRI-5010-380-0055

The purpose of this report is to provide an overview of research activities related to production of natural gas from unconventional sources. The overview discusses government and industry research activities in the four areas of unconventional gas--western tight sands, Devonian shale, coal seams, and geopressured aquifers.

PB80-221179 PC **A04**/MF **A01**
Gas Research Inst., Chicago, IL.
Proceedings of GRI (Gas Research Institute) Gas Hydrate Workshop Held at Denver, Colorado on February 1, 1979.
J. Cox. 1 Feb 79, 59p GRI-79/0009

Uncertainties associated with the occurrence and magnitude of gas hydrates are paralleled by the problems of extraction and recovery. Indications are, however, that there are probably immense resources of natural gas tied up in hydrate form and that thermal methods are the most likely prospect for recovery.

PB80-227515 PC **A06**/MF **A01**
Eagle Crusher Co., Inc., Galion, OH.
Portable Crusher for Underground Mining Applications and Design. Phase I - Design.
Open file rept. (Final),
Harold J. Miller, Edward E. Laughbaum, and William R. Fisher. 31 Aug 78, 111p BUMINES-OFR-100-80
Contract J0285003

This report summarizes proposals and findings made in conjunction with the newly designed M-44 low head portable crusher which is believed well capable of meeting the requirements of a 'portable, underground, hard rock' machine as previously defined in earlier reports. Data gathered by use of the 1/4-scale model of the M-44 has substantiated and verified the concept sufficiently to justify construction of a full-size machine for further testing under actual mine conditions.

PB80-227622 PC **A10**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
Evaluation of the Kloswall Longwall Mining System.
Final rept. on Phase 1, Jul 76-Aug 77,
Paul J. Guay. Sep 78, 211p BUMINES-OFR-102-80
Contract J0265028

This report presents the results of evaluating a longwall mining system specifically designed to extract a very deep web (60 inches or deeper) from a longwall panel. The report includes a productivity and cost analysis comparing the new mining system with a high-capacity conventional longwall operation taking a 30-inch-wide web. The analysis shows the new system will increase annual production 44-percent and decrease cost per ton off the face 21-percent. The report also includes conceptual drawings and specifications for a high-capacity four-drum shearer and a unique shield-type roof support specifically designed for very wide-web operations. The advantages and problems associated with wide-web mining are discussed in general and as they relate specifically to the equipment selected for the new mining system. The study concludes by recommending that surface coal loading tests be conducted as the follow-on work.

PB80-227648 PC **A12**/MF **A01**
West Virginia Univ., Morgantown. Dept. of Electrical Engineering.
Mine Wide Test of the WVU Monitoring Concept. Phase II Final Report: Modular Mine Monitoring and Control System.
Open file rept. 21 Aug 77-29 Feb 80,
R. S. Nutter, W. R. Voltz, and M. D. Aldridge. 29 Feb 80, 273p BUMINES-OFR-103-80
Contract H0144114
See also report on Phase 1, PB-280 119.

The results of designing, constructing, and laboratory testing of a modular, distributed, microprocessor-based mine monitoring and control system are presented. A standard computer communications protocol (DDCMP) was utilized throughout the system. Tests were performed on the utilization of a high-level language for programming mine monitoring and control systems. Laboratory tests were run on a combined air velocity-methane sensor.

PB80-228984 PC **A05**/MF **A01**
Minnesota Univ.-Duluth. Dept. of Geology.
Estimation and Evaluation of the Iron Ore Reserves of the United States - A Partial Survey, 1974-75. Iron Ore Reserves of the Mesabi Range, Minnesota. A Minerals Availability System Report.
Open file rept. (Final) 1 Jun 78-1 Jun 79,
Ralph W. Marsden. 23 Jan 80, 81p BUMINES-OFR-109-80
Grant J0188074

This report is a comprehensive study of the iron ore reserves of the Mesabi Range, Minn. Iron ore has been classified into seven categories with descriptions of each category and the geologic factors affecting each reserve estimate. Iron ore reserves for all classes, grades, and probabilities are based on breakeven analysis and average 1974 dollars. The reserve estimate is reported on a township-range basis.

PB80-228992 PC **A11**/MF **A01**
Washington State Univ., Pullman. Dept. of Geology.
Evaluation of Metal Resources at and Near Proposed Deep Sea Mine Sites.
Open file rept. (Final),
R. H. Fewkes, W. D. McFarland, W. R. Reinhart, and R. K. Sorem. 15 Feb 80, 239p BUMINES-OFR-108-80
Grant G0284008

The resource potential of three central Pacific manganese nodule deposits is evaluated using sea floor photographs and box core samples. Mean nodule concentration for the three deposits ranged from a low of 3.8 kg/square meters (dry) near DOMES Site B to a high of 7.1 kg/square meters (dry) near DOMES Site C. A nodule concentration of 4.4 kg/square meters (dry) was estimated for the area surrounding DOMES Site A. Nodules rich in Mn, Ni, and Cu characterize the Site B area, but low nodule abundance estimates suggest a limited resource potential. Nodule grade is lower and nodule abundance is slightly higher near Site A. The area surrounding Site C appears to have the greatest potential for supplying ocean floor metals. An extensive appendix is included listing metal values for 882 nodules recovered from 144 sample sites. Sample locations and mean metal values for each location are shown on 44 maps. The report also includes an extensive listing of nodule physical characteristics and population data derived from the analysis of sea floor photographs.

PB80-853526 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tar Sands. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 36p
NERACUSGNT0828
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discribe the processes involved in the mining and recovery of Tar Sands and the production of Tar Sand derivatives. A discussion of the application of Tar Sand to energy production is also included. (Contains 023 citations.)

PB80-853534 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tar Sands. September, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Sep 76-May 80,
William V. Sassi. Aug 80, 179p
NERACEDBNT0828
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discribe the processes involved in the mining and recovery of Tar Sands and the production of Tar Sand derivatives. A discussion of the application of Tar Sand to energy production is also included. (Contains 200 citations.)

PB80-855158 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Petroleum Prospecting. July, 1979-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jul 79-Jun 80,
Lawrence H. Marcus. Jul 80, 203p NERACEI NT0522
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which cover the field of petroleum prospecting, including identification and estimation of oil reserves, seismic surveying, stratigraphy, magnetic and radiometric surveying and well drilling. (Contains 200 citations.)

PB80-855166 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Petroleum Prospecting. August, 1978-May, 1980 (Citations from the Energy Data Base).
Rept. for Aug 78-May 80,
Lawrence H. Marcus. Jul 80, 167p
NERACEDBNT0522
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which cover the field of petroleum prospecting, including identification and estimation of oil reserves, seismic surveying, stratigraphy, magnetic and radiometric surveying and well drilling. (Contains 200 citations.)

PB80-856370 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Mining and Mineral Industry. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 90p NERACEI NT1055
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the operations research and analysis of the mining and mineral industries. Citations include descriptions of computer technology, mineral deposit evaluation techniques, reserves estimation, optimum site selection, geostatistical simulation, capacity analysis, and production planning applied to increasing design precision of mineral projects. (Contains 088 citations.)

PB80-857196 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tar Sands. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 109p NERACEI NT0828
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the processes involved in the mining and recovery of Tar Sands, and the production of Tar Sand derivatives. A discussion of the application of Tar Sand to energy production is also included. (Contains 108 citations.)

PB80-857493 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cryolite. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 56p NERACEI NT0509

Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography discusses the metallurgy and properties of cryolite and cryolite-aluminium melts, including thermodynamics, electrical conductivity, behavior of melts, and growth of particles. The composition of cryolite melts is also presented. (Contains 054 citations.)

PB80-857618 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Petroleum Reservoir Fluids - Properties. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 136p NERACEDBNT0784
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the types, properties, and behavior of petroleum and natural gas reservoir fluids and on the nature of the reservoirs themselves are contained in this retrospective bibliography. (Contains 087 citations.)

PB80-857626 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Petroleum Reservoir Fluids - Properties. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 68p NERACEI NT0784
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the types, properties, and behavior of petroleum and natural gas reservoir fluids and on the nature of the reservoirs themselves are contained in this retrospective bibliography. (Contains 042 citations.)

PB80-857659 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Surveys. March, 1974-June, 1980 (Citations from the NTIS Data Base).
Rept. for Mar 74-Jun 80,
John H. Frey. Jun 80, 169p NERACUSGNT0817
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on aerial magnetic and radiometric surveys conducted at specific geographic locations, chiefly in the United States, to locate uranium deposits are contained in this retrospective bibliography. (Contains 149 citations.)

PB80-857667 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Surveys. January, 1979-May, 1980 (Citations from the Energy Data Base).
Rept. for Jan 79-May 80,
John H. Frey. Jun 80, 208p NERACEDBNT0817
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on aerial magnetic and radiometric surveys conducted at specific geographic locations, chiefly in the United States, to locate uranium deposits are contained in this retrospective bibliography. (Contains 200 citations.)

PB80-857675 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Surveys. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
John H. Frey. Jun 80, 150p NERACIAANT0817
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on magnetic surveys of the earth's main magnetic field and it variations and of magnetic anomalies associated with natural resources are contained in this retrospective bibliograpy. (Contains 164 citations.)

PB80-858475 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Coal Mining. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 179p NERACEI NT0585
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations covering the various coal mining techniques. Strip, surface, and open pit mining as well as restoration and landscaping after mining are also discussed. (Contains 120 citations.)

PB80-858483 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Coal Mining. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 199p
NERACEDBNT0585
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations covering the various coal mining techniques. Strip, surface, and open pit mining as well as restoration and landscaping after mining are also discussed. (Contains 109 citations.)

SAND-80-0836 PC **A05**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Rock Springs Site 12 Hydraulic/Explosive True in Situ Oil Shale Fracturing Experiment.
R. L. Parrish, R. R. Boade, A. L. Stevens, A. Long, Jr., and T. F. Turner. Jun 80, 87p
Contract AC04-76DP00789

The experiment plan involved the creation and characterization of three horizontal hydraulic fractures, followed by the insertion and simultaneous detonation of slurry explosive in the two lower fractures. Core analyses, wellbore logging, and airflow and exp 85 Kr tracer tests were used for site characterization and assessment of the hydraulic and explosive fracturing. Tiltmeters, wellhead pressure and flow gages, and in-formation pressure, flow and crack-opening sensors were used to monitor hydrofracture creation and explosive insertion. Explosive detonation diagnostic data were taken with stress and time-of-arrival gages and surface and in-formation accelerometers. The post-fracturing assessments indicated that: (1) hydrofracture creation and explosive insertion and detonation were accomplished essentially as planned; (2) induced fractures were randomly distributed through the shale with no extensively fractured regions or dislocation of shale; and (3) enhancement of permeability was limited to enlargement of the explosive-filled fractures. (ERA citation 05:030208)

SAND-80-1223 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Instrumentation and Operational Requirements for Pilot-Scale CO sub 2 Enhanced Oil Recovery Projects.
W. D. Lyle, Jr., and S. W. Eisenhawer. Jun 80, 51p
Contract AC04-76DP00789

This report describes an instrumentation system to monitor a miscible displacement pilot flood under carefully controlled conditions. The primary focus is on CO sub 2 flooding but the results apply equally well to other types of miscible floods. Included are discussions of the physical processes in a CO sub 2 flood, a review of existing CO sub 2 floods, instrumentation available, site selection and characterization, operation of the flood, simulator evaluation, and cost estimates for this type of project. Throughout the report it is emphasized that determination of residual oil saturation before and after the flood is crucial to evaluation of the results. (ERA citation 05:030175)

SAND-80-1282C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Pressure Instrumentation for Geothermal Borehole Logging.
T. D. McConnell. 1980, 4p CONF-800920-10
Contract AC04-76DP00789
Geothermal Resource Council annual meeting, Salt Lake City, UT, USA, 9 Sep 1980.

Accurate geothermal logging requires pressure measurements with resolutions down to 0.01 psi in environments of up to 275 exp 0 C and 15,000 psi. The characteristics of several basic types of pressure transducers are examined and compared to these requirements. Specific deficiencies are identified such as thermal stability and resolution limitations; R and D activities and results correcting these deficiencies are discussed. (ERA citation 05:030563)

SAND-80-1339 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
DEEP STEAM Project. Quarterly Report, 1 October-31 December 1979.
S. W. Eisenhawer, R. L. Fox, D. R. Johnson, A. B. Donaldson, and A. J. Mulac. Jul 80, 29p
Contract AC04-76DP00789

Objective of Project DEEP STEAM is to develop the technology required to economically produce heavy oil from deep reservoirs. The accomplishments attained during this reporting period include: completion of the initial phase of full-scale simulation testing of thermally efficient well completions, initiation of full-scale simulation testing of two downhole steam generator concepts, and the steam generator and support systems for the Sandia/Chevron field test successfully completed continuous operation evaluation preparatory to delivery to the Bakersfield, CA site. (ERA citation 05:030176)

SAND-80-1344C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Enhancing Permeability in Oil Shale and Applications to Tar Sands.
J. T. Schamaun. 1980, 13p CONF-800541-3
Contract AC04-76DP00789
Tar sands permeability enhancement workshop, Albuquerque, NM, USA, 8 May 1980.

Explosive fracturing and rubblization are used to enhance oil shale permeability. Blasting strategy and results are discussed, in particular the Geokinetics blasting. The field data desired are listed. Comments are offered on the extension of the blasting techniques to tar sands. (ERA citation 05:030209)

SAND-80-1679C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
DOE Enhanced Oil Recovery Projects.
1980, 12p CONF-800750-1
Contract AC04-76DP00789
Meeting for DOE enhanced oil recovery project, San Francisco, CA, USA, 22 Jul 1980.

Objectives of Project DEEP STEAM are to examine modified well completions for surface injection into deep reservoirs, develop economic downhole steam generators, and examine existing reservoir models for modifications required for steam injection into deep heavy-oil reservoirs. The project is designed for producing low-gravity reservoirs. (ERA citation 05:030177)

8J. Physical Oceanography

AD-A087 778/7 PC **A02**/MF **A01**
Oregon State Univ Corvallis School of Oceanography
Asymptotic Regimes in Mixed-Layer Deepening,
Roland A. de Szoeke, and P. B. Rhines. Jul 75, 7p Rept no. 76-17
Contract N00014-75-C-0299, Grant NSF-GX-36342
Pub. in Jnl. of Marine Research, v34 p111-116 1976.

No abstract available.

AD-A087 789/4 PC **A03**/MF **A01**
Oregon State Univ Corvallis School of Oceanography
Chemical Characteristics of Pacific Northwestern Coastal Waters -- Nutrients, Salinities, Seasonal Fluctuations,
Elliot L. Atlas, Louis I. Gordon, and Richard D. Tomlinson. 1978, 26p Rept no. 78-30
Contract N00014-67-A-0369-0007, Grant NSF-GA-12113

Pub. in Marine Plant Biomass of the Pacific Northwest Coast, p57-79 1978.

No abstract available.

AD-A087 988/2 PC **A03**/MF **A01**
Oregon State Univ Corvallis School of Oceanography
One-Dimensional Models of the Upper Ocean,
P. P. Niiler, and E. B. Kraus. 1977, 32p Rept no. 77-25
Contracts N00014-76-C-0067, N00014-75-C-0299
Pub. in Modelling and Prediction of the Upper Layers of the Ocean, p143-172 1977.

No abstract available.

AD-A088 026/0 PC **A02**/MF **A01**
Naval Ocean Systems Center San Diego CA
The pH Response of a Shiny Platinum Electrode.
Technical rept. May-Sep 79,
D. P. Oksanen, and Alberto Zirino. 1 May 80, 12p Rept no. NOSC/TR-534

Platinum electrodes have been used by biologists and geologists to map variations in the level of oxidative degradation in the field and to draw conclusions about electron limits of particular environments based on assumptions as to actual reactions occurring on the platinum (Pt) surface. This research was done to determine if the Pt surface can be calibrated for its reaction to other seawater constituents, then perhaps the Pt electrode can be used to measure one specific redox reaction and further define the natural seawater environment. (Author)

AD-A088 084/9 PC **A03**/MF **A01**
Naval Research Lab Washington DC
A Highly Portable Data Acquisition System for Total Magnetics Field Measurements.
Memorandum rept.,
Daniel Steiger. 8 Aug 80, 27p Rept no. NRL-MR-4300

At the Naval Research Laboratory highly portable intelligent terminals are being utilized aboard oceanographic platforms for the acquisition and storage of total magnetic field measurements. Described in the paper is the design and implementation of the data acquisition system which includes a detailed description of the hardware and software utilized. (Author)

AD-A088 216/7 PC **A03**/MF **A01**
Naval Ocean Systems Center San Diego CA
Sediment Bioassays for NAVSTA San Diego Dredging Project.
Final rept. Mar 78-Jan 80,
M. H. Salazar, S. C. U'ren, and S. A. Steinert. Apr 80, 49p Rept no. NOSC/TR-570

Bioassays were conducted on sediments from 13 sites associated with Navy activities in San Diego Bay using liquid, particulate, and solid phase test solutions. Sediments were pre-sampled to determine the most contaminated area at each site based on the relative concentration of cadmium, chromium, copper, and mercury. Five different marine species representing a variety of phylogenetic levels and feeding types were used in the toxicity tests with the most contaminated sediments including copepods, mysids, fish, clams, and worms. The results of the bioassays suggest that dredged material from Navy Piers 1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 13, JK, and Chollas Creek Channel should not have a significantly adverse effect on the marine environment during disposal operations. (Author)

AD-A088 258/9 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Concept Evaluation for New Small Scale Oceanographic Temperature and Salinity Measurement Technique.
Memorandum rept.,
J. P. Dugan. 20 Aug 80, 16p Rept no. NRL-MR-4249

A new concept for making measurements of ocean temperature and salinity down to spatial scales of about one centimeter is evaluated. A common measurement cell incorporating both an accurate electrical conductivity sensor and a sound velocity sensor is expected to provide fast response rates and little bias due to 'mismatch' between the sensor response rates. Resolution and frequency response are limited only by cell size and flushing rate. (Author)

AD-A088 277/9 PC **A02**/MF **A01**
Materials Research Labs Ascot Vale (Australia)
The Density of Seawater: Some Practical Relationships.
Technical note,
Daniel J. Whelan. May 80, 25p Rept no. MRL-TN-437

Traditionally, the density of seawater as a function of temperature and salinity at atmospheric pressure has been discussed in terms of the density function, Sigma-T, and, in this report, some simplified mathematical relationships are presented from which changes in Sigma-T can be predicted from changes in temperature and salinity. However, density is also affected by pressure and an accurate treatment of the density of seawater within a deep ocean water mass requires a more sophisticated approach. An outline of one such treatment and the results obtained from it are given in detail. (Author)

AD-A088 297/7 PC **A02**/MF **A01**
Oregon State Univ Corvallis School of Oceanography
EXPOSURE. A Newsletter for Ocean Technologists. Volume 8, Number 3.
Technical rept.,
Roderick Mesecar. Jul 80, 9p
Contract N00014-79-C-0004

This report describes Transmittance and Temperature Sensor Flow Step Response Tape-Fouling Problem: Aanderaa Thermistor Chains.

AD-A088 312/4 PC **A03**/MF **A01**
Royal Australian Navy Research Lab Edgecliff
Results of Environmental Measurements on the North-West Shelf and Eastern Indian Ocean (April-May 1979).
Technical note,
Phillip J. Mulhearn. Nov 79, 39p Rept no. RANRL-TN-3/79

Oceanographic and meteorological results from RANRL Cruise 1/79 to the east Indian Ocean are presented. The oceanographic data for the Australian North-West Shelf show that over the shelf and slope there were both surface and bottom well-mixed layers, separated by a sharp thermocline and that in the vicinity of Rowley Shoals there was considerable variability in temperature profiles. Also in this region many of the temperature profiles off the shelf has a step-like structure. There appeared to be a southward current over the continental slope. The meteorological results often revealed the presence of small inversions at a height of approximately 100 m above the sea and showed that a sea-breeze at the coast was not felt 80 km or more out to sea. (Author)

AD-A088 445/2 PC **A04**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
Physical and Chemical Data Report.
15 Jun 80, 58p Rept no. SIO-REF-80-10
Contract N00014-75-C-0152

This report contains hydrographic data collected during three separate expeditions during 1970. They were SCAN Expedition Leg X, BIOS Expedition and 7-TOW Expedition Legs V, VI and VII. No hydrographic data was collected on other legs of the expeditions. Preceding the tabulated data for each cruise are; (1) a description of the principal objectives and the hydrographic work carried out including all 'non-standard' procedures; (2) the sponsoring agency; (3) publications utilizing data from the expedition; (4) a list of scientific personnel participating in the collection of data; and (5) a station chart indicating the station positions.

AD-A088 537/6 PC **A02**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
The Thermocline Response to Transient Atmospheric Forcing in the Interior Midlatitude North Pacific 1976-1978,
Warren White, Robert Bernstein, Gerald McNally, Steve Pazan, and Robert Dickson. 21 Jul 78, 18p
Contract N00014-75-C-0152
Pub. in Jnl. of Physical Oceanography, v10 n3 p372-384 Mar 80.

No abstract available.

N80-29826/8 PC **A09**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Seasat. Volume 3: Ground Systems.
Final Report.
E. Pounder. 15 Jun 80, 200p NASA-CR-163442, JPL-PUB-80-38-V-3
Contract NAS7-100

The Seasat Project was a feasibility demonstration of the use of orbital remote sensing for global ocean observation. The satellite was launched in June of 1978 and was operated successfully until October 1978. A massive electrical failure occurred in the power system, terminating the mission prematurely. The ground systems using during the mission life are discussed. Descriptions of the operating organization, the system elements, and the testing program are included. The various phases of the mission: launch and orbit insertion; cruise; and calibration are discussed. A special section is included on the orbit maneuver activites. Operations during the satellite failure are reviewed and summarized.

8K. Seismology

AD-A088 081/5 PC **A03**/MF **A01**
Lisle Computer Corp Albuquerque NM
Design Description Day Tape Programs.
Final rept. 1 Jun 79-29 Feb 80,
Frank C. Lisle, Panola J. Lisle, and I. Yvonne Montford. 29 Apr 80, 48p AFOSR-TR-80-0631
Contract F49620-79-C-0101, ARPA Order-3750

This report describes the computer programs which produce the seismic data day tapes for the Global Digital Seismic Network from the station seismic tapes. The programs execute on a D.E.C. PDP 11/34 digital computer using the UNIX operating system and are written in C language. (Author)

AD-A088 101/1 PC **A07**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Geotechnical Lab
Evaluation of Geophysical Methods for Cavity Detection at the WES Cavity Test Facility.
Final rept. Jun 75-Oct 78,
Dwain K. Butler, and William L. Murphy. Jun 80, 136p Rept no. WES/TR/GL-80-4

The study reported herein was undertaken to plan and construct a controlled Cavity Test Facility for use in preliminary evaluation of geophysical methods as cavity location or delineation tools and to evaluate several geophysical techniques to determine whether signatures could be obtained that would help to either locate a cavity or, once located, to determine its size, depth, or shape in plan view. Seismic studies conducted at the Cavity Test Site consisted of surface compression wave refraction surveys, crosshole shear wave surveys, shallow seismic reflection surveys, Meissner wave-front surveys, and a sonar investigation. Results for each of these studies are given. Surface resistivity surveys were also made, including the following methods: Modified Bristow or Bristow-Bates, Wenner profiling, Schlumberger sounding, and dipole-dipole. Subsurface resistivity tests were also accomplished. Radar tests using three different radar systems: a 4.2-GHz continuous wave-frequency modulated (CW-FM) system, a 100-Hz pulse radar system, and a 300-MHz pulse radar system--were also performed at the Cavity Test Facility. Results of the attempt to detect cavities at the WES Cavity Test Facility were mostly negative. It is recommended that an alternate test site be found where conditions are not as extreme, that cavity detection research continue, and that the following geophysical methods be investigated;

microgravimetric techniques including gravity-gradient measurements, high-resolution seismic profiling, expanding spread seismic fan shooting, cavity diffraction signatures with crosshole geometry, and continued study of subsurface probing radar to determine the lithology dependence of its applicability.

AD-A088 123/5 PC **A06**/MF **A01**
Colorado Univ At Boulder
Deterministic Methods of Seismic Source Identification.
Semi-annual technical rept. no. 1, 1 Oct 79-30 Mar 80,
C. B. Archambeau. Oct 79, 119p AFOSR-TR-80-0630
Contract F49620-80-C-0018, ARPA Order-3291

In order to interpret seismic event discrimination in terms of the physical properties of the source and to be able to establish new discrimination techniques we have generalized seismic source models based on relaxation source theory to include the effects of non-homogeneous initial prestress. In particular we have considered the effects of strongly concentrated prestress in the vicinity of the shatter zone produced by an explosion. The important result from the work so far completed are: (1) the spectra of P and S waves radiated due to stress relaxation effects can be strongly peaked, with the nature of the peaking being azimuthally dependent in general and quite strongly dependent on the size and location of the initial stress concentration; (2) the corners or peak frequencies of the P and S wave radiation are different from one another (S lower) and are both shifted to higher frequencies when the stress concentration is close to the shatter zone. In addition, the corner or peak frequency value is related to the size of the stress concentration rather than to the size of the shatter zone; (3) the pattern of first motions from the tectonic release, when the prestress is inhomogeneous, is not pure quadrupole with higher order multiples also involved. The ordinary quadrupolar pattern predicted from a homogeneous prestress can be strongly distorted when the prestress is concentrated and can be highly nonquadrupole in form. (Author)

AD-A088 357/9 PC **A05**/MF **A01**
Teledyne Geotech Garland TX
An Assessment of the Use of Strain and Inertial Seismographs to Enhance Seismic Signal to Noise Ratios.
Final rept.,
G. G. Sorrells, and O. D. Starkey. 7 Mar 80, 86p TR-80-6, AFOSR-TR-80-0633
Contract F49620-79-C-0015, ARPA Order-3291

In order to verify compliance with the terms of the proposed comprehensive nuclear test ban treaty, seismic monitoring sites may be located at regional distances from potential test sites. It can be reasonably assumed that some type of signal-to-noise ratio (SNR) enhancement technique will have to be applied to the raw data collected at these sites in order to detect and identify the source of the relatively weak seismic signals generated by low magnitude earthquakes and underground nuclear explosions. In the past, seismic arrays coupled with simple beamforming data processing methods have been used extensively to enhance short period teleseismic SNRs. Utilization of this technique is based upon the observation that in the frequency bandwidth commonly occupied by teleseismic signals, the signal field generally appears to be much better organized than the ambient earth noise. However, recent studies by Mrazek et al (1979) indicate that the lateral decorrelation of regional signal fields is comparable to that of the earth noise field in commonly shared bandwidths. Under these conditions, the use of horizontally distributed arrays, coupled with simple beamforming techniques is not likely to yield significant improvements in regional SNRs. Thus, there is a need to reassess the use of existing SNR enhancement methods as they pertain to the detection and identification of weak regional seismic signals.

AD-A088 487/4 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory Palisades NY
Reflection and Transmission of Obliquely Incident Rayleigh Waves at a Vertical Discontinuity between Two Welded Quarter-Spaces,
Thomas C. Chen, and Leonard E. Alsop. 16 Oct 78, 17p LDGO-2881, AFOSR-TR-80-0621
Contract F49620-77-C-0008, ARPA Order-3291
Pub. in Bulletin of the Seismological Society of America, v69 n5 p1409-1423 Oct 79. Sponsored in part by Grant NSF-EAR75-21788.

No abstract available.

AD-A088 513/7 PC **A03**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
Seismic Detection and Discrimination Using Ocean-Bottom Seismographs.
Annual technical rept. 1 Oct 78-30 Sep 79,
L. M. Dorman, J. A. Orcutt, and T. H. Jordan. Sep 79, 47p AFOSR-TR-80-0627
Contract F49620-79-C-0019, ARPA Order-3291

Research progress on seismic detection and discrimination using ocean-bottom seismographs (OBS's) is outlined. During this first year of DARPA contract work, our investigations have been focused primarily on using existing OBS data to address the problem of sea-floor seismic noise and to constrain models of the near-bottom seismic environment. We have completed noise studies at six of our previously occupied OBS sites. The noise levels of typical amplitude spectra roll off rapidly out to 2-4 Hz and much less rapidly beyond 4 Hz. At frequencies above 4 Hz, the noise levels are low, typically a few nanometers/Hz1/2 or less and comparable to good land-based stations. Several correlations between noise levels and other parameters, such as sediment thickness, distance from the continental margin and sea state, are discussed and used to constrain possible noise mechanisms. We hypothesize that the dominant mechanism of high-frequency (>2 Hz) noise generation at most of the sites examined thus far is of local oceanographic origin, exciting acoustic modes in the water column which couple to Stoneley modes at the sediment-water interface and waveguide modes within the sediment column. This hypothesis is supported by the analysis of noise data from two OBS arrays, which shows that the noise coherence is very low for pairs of sensors separated by as little as 200 m. We also outline some of the conclusions relevant to the seismic noise problem deduced by us from the data collected during the Lopez Island intercalibration experiment.

DP-MS-80-16 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Studies of the Subsurface Effects of Earthquakes.
I. W. Marine. 1980, 37p CONF-800245-1
Contract AC09-76SR00001
Workshop on subsurface seismic studies, Seattle, WA, USA, 20 Feb 1980.

As part of the National Terminal Waste Storage Program, the Savannah River Laboratory is conducting a series of studies on the subsurface effects of earthquakes. This report summarizes three subcontracted studies. (1) Earthquake damage to underground facilities: the purpose of this study was to document damage and nondamage caused by earthquakes to tunnels and shallow underground openings; to mines and other deep openings; and to wells, shafts, and other vertical facilities. (2) Earthquake related displacement fields near underground facilities: the study included an analysis of block motion, an analysis of the dependence of displacement on the orientation and distance of joints from the earthquake source, and displacement related to distance and depth near a causative fault as a result of various shapes, depths, and senses of movement on the causative fault. (3) Numerical simulation of earthquake effects on tunnels for generic nuclear waste repositories: the objective of this study was to use numerical modeling to determine under what conditions seismic waves might cause instability of an underground opening or create fracturing that would increase the permeability of the rock mass. (ERA citation 05:029763)

NUREG/CR-0055-V-2 PC **A16**/MF **A01**
Shannon and Wilson, Inc., Seattle, WA.
Verification of Subsurface Conditions at Selected 'Rock' Accelerograph Stations in California. Volume 2.
Technical rept.
Sep 80, 352p
Prepared in cooperation with Agbabian Associates, El Segundo, CA. See also Volume 1, PB-282 205.

Second in a series of reports to investigate the subsurface soil conditions at accelerograph stations which have been categorized by other researchers as 'rock' sites. Contained in this volume are our findings of the site conditions at 29 accelerograph stations in California. Subsurface conditions at the sites were investigated with a geologic reconnaissance and a review of available boring data.

NUREG/CR-0055-V-2-APP PC **A12**/MF **A01**
Shannon and Wilson, Inc., Seattle, WA.
Verification of Subsurface Conditions at Selected 'Rock' Accelerograph Stations in California. Volume 2, Appendix. Earthquake Records.
Sep 80, 263p
Prepared in cooperation with Agbabian Associates, El Segundo, CA.

Appendix to the second in a series of reports to investigate the subsurface soil conditions at accelerograph stations which have been categorized by other researchers as 'rock' sites in California. Appendix to Volume 2 contains the accelerograms which have been recorded at the sites investigated. Subsurface conditions at the sites were investigated with a geologic reconnaissance and a review of available boring data.

NUREG/CR-0055-V-3 PC **A11**/MF **A01**
Shannon and Wilson, Inc., Seattle, WA.
Verification of Subsurface Conditions at Selected 'Rock' Accelerograph Stations in California. Volume 3.
Technical rept.
Sep 80, 236p
Prepared in cooperation with Agbabian Associates, El Segundo, CA.

This report is the third in a series presenting geotechnical information for accelerograph stations in California that have been classified as 'rock' sites by one or more investigators. This volume discusses the findings at five locations which are in the vicinity of nine accelerograph stations. Although each of these stations was originally discussed in one of the earlier reports in this series, the available information on the subsurface conditions at each site was insufficient for determining the dynamic properties of the subsurface soils or the depth to rock.

NUREG/CR-1648 PC **A10**/MF **A01**
Michigan Univ., Ann Arbor.
A Probabilistic Evaluation of Earthquake Detection and Location Capability for Illinois, Indiana, Kentucky, Ohio, and West Virginia,
Frederick J. Mauk, and Douglas H. Christensen.
Sep 80, 213p
Contract NRC-04-76-192

Probabilistic estimations of earthquake detection and location capabilities for the states of Illinois, Indiana, Kentucky, Ohio and West Virginia are presented in this document. The algorithm used in these epicentrality and minimum-magnitude estimations is a version of the program NETWORTH by Wirth, Blandford, and Husted (DARPA Order No. 2551, 1978) which was modified for local array evaluation at the University of Michigan Seismological Observation. Estimations of earthquake detection capability for the years 1970 and 1980 are presented in four regional minimum m sub b magnitude contour maps. Regional 90% confidence error ellipsoids are included for m sub b magnitude envents from 2.0 through 5.0 at 0.5 m sub b unit increments. The close agreement between these predicted epicentral 90% confidence estimates and the calculated error ellipses associated with actual earthquake within the studied region suggest that these error determinations can be used to estimate the reliability of epicenter location.

PB80-854359 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Seismographs. December, 1972-June, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 72-Jun 80,
John H. Frey. Jun 80, 198p NERACUSGNT0785
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the theory, operation, and applications of seismographs and on the employment of seismographs at specific locations and in specific environments are contained in this retrospective bibliography. (Contains 195 citations.)

PB80-854367 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Seismographs. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 88p NERACEDBNT0785
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the theory, operation, and applications of seismographs and on the employment of seismographs at specific locations and in specific environments are contained in this retrospective bibliography. (Contains 080 citations.)

PB80-854375 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Seismographs. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 118p NERACEI NT0785
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the theory, operation, and applications of seismographs and on the employment of seismographs at specific locations and in specific environments are contained in this retrospective bibliography. (Contains 131 citations.)

PB80-854383 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Seismographs. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
John H. Frey. Jun 80, 94p NERACIAANT0785
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the theory, operation, and applications of seismographs and on the employment of seismographs at specific locations and in specific environments are contained in this retrospective bibliography. (Contains 112 citations.)

PB80-854391 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Seismometers. July, 1975-May, 1980 (Citations from the NTIS Data Base).
Rept. for Jul 75-May 80,
John H. Frey. Jun 80, 217p NERACUSGNT0786
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on various types of seismometers (portable, stationary, on-land, underwater) and their testing and applications (earthquakes, engineering, petroleum, security, non-nuclear military) as well as their employment at specific locations are contained in this retrospective bibliography. (Contains 198 citations.)

PB80-856453 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Signal Processing of Seismic Waves. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 135p NERACEDBNT1089
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the mathematical analysis and signal processing of seismic waves and spectra are cited in this retrospective bibliography. (Contains 124 citations.)

PB80-856461 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Signal Processing of Seismic Waves. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 140p NERACEI NT1089
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the mathematical analysis and signal processing of seismic waves and spectra are cited in this retrospective bibliography. (Contains 133 citations.)

PB80-856479 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Signal Processing of Seismic Waves. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
John H. Frey. Jun 80, 79p NERACIAANT1089
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the mathematical analysis and signal processing of seismic waves and spectra are cited in this retrospective bibliography. (Contains 075 citations.)

PB80-860133 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Signal Processing of Seismic Waves. January, 1975-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 75-Jun 80,
John H. Frey. Jun 80, 217p NERACUSGNT1089
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the mathematical analysis and signal processing of seismic waves and spectra are cited in this retrospective bibliography. (Contains 199 citations.)

8L. Snow, Ice, and Permafrost

AD-A087 989/0 PC **A03**/MF **A01**
Washington Univ Seattle Dept of Oceanography
A Field Study of Brine Drainage and Oil Entrainment in First-Year Sea Ice.
Technical rept.,
Seelye Martin. 22 Dec 78, 32p Rept nos.
CONTRIB-1114, CONTRIB-522
Contract N00014-76-C-0234
Also available as rept. no. TR-38. Pub. in Jnl. of Glaciology, v22 n88 p473-502 1979.

No abstract available.

AD-A088 142/5 PC **A02**/MF **A01**
Washington Univ Seattle Dept of Atmospheric Sciences
The Effect of Bubbles Released from a Melting Ice Wall on the Melt-Driven Convection in Salt Water.
Technical rept.,
Edward G. Josberger. 17 May 79, 7p Rept nos.
TR-39, CONTRIB-509
Contract N00014-76-C-0234
Pub. in Jnl. of Physical Oceanography, v10 n3 p474-477 Mar 80.

No abstract available.

8M. Soil Mechanics

DOE/EV/10040-2 PC **A03**/MF **A01**
Institute of Ecology, Indianapolis, IN.
Role of Organic Soils in the World Carbon Cycle: Problem Definition and Research Needs.
T. V. Armentano. 1979, 43p
Contract AC02-79EV10040

The following goals were addressed in the workshop: review and analysis of available data on carbon in organic soils from the past century to the present; assessment of the probable flux of carbon to and from organic soils in the near future; identification of major data inadequacies which preclude reliable analysis of the principal processes influencing carbon flux in organic soils; and proposal of research initiatives which could improve understanding of organic deposits in relation to the carbon cycle within a time frame of two to four years. The major finding of the workshop is that the organic soils are important in the overall carbon budget. Histosols and gleysols, the major organic soil deposits of the world, normally sequester organic carbon fixed by plants. They may now be releasing enough carbon to account for nearly 10% of the annual rise in atmospheric content of CO sub 2 . Current annual release of carbon from organic soils is estimated to fall within the range of 0.03 to 0.37 x 10 exp 9 t, a release equivalent to 1.3% to 16% of the annual increase of carbon in the atmosphere. Present annual releases of carbon from the Everglades Agricultural Area in Florida and the Sacramento-San Joaquin Valley in California are estimated at 0.017 x 10 exp 9 tons. Annual sequestering of carbon by undrained organic soils has been estimated at about 0.045 x 10 exp 9 tons. Several strategies for peatland management are available, including creation, preservation, functional designation, and use of wetlands for agriculture and energy supply. (ERA citation 05:031139)

NUREG/CR-1638 PC **A09**/MF **A01**
Shannon and Wilson, Inc., Seattle, WA.
Evaluation of In-Situ Soil Damping Characteristics.
Sep 80, 179p
Contract NRC-04-76-200
Prepared in cooperation with Agbabian Associates, El Segundo, CA.

This study consists of a development of procedures for estimating strain-dependent damping ratios from in-situ impulse test data. Two types of methods, both based on phase differences between stress and strain have been developed. The first, termed loop methods, is based on estimation of the shape of the hysteresis loop, once the secant shear modulus is obtained from the in-situ impulse test. The second, termed equilibrium methods, utilizes dynamic equilibrium equations to estimate shear stress which, when considering its phase relationship with shear strain, can be used to estimate the damping ratio.

PATENT-4 199 974 Not available NTIS
Department of the Interior, Washington, DC.
Eolian Sand Trap.
Patent,
Steven G. Fryberger, and Thomas S. Ahlbrandt.
Filed 15 Sep 78, patented 29 Apr 80, 7p PB80-214323, PAT-APPL-942 847
Supersedes PB-292 206.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention provides a trapping and measuring device for collecting and weighing wind borne particles of sand in the desert or the like. The device includes a rotatable trapping housing which is constructed to permit the wind to pass therethrough while trapping the sand carried by the wind. The column-like housing is mounted on a fixed base which contains a funnel and collector cup assembly together with a transducer for weighing the sand collected in the cup. A wind-catching plate attached to the rotatable housing provides orientation of the housing entrance openings so as to face the wind. A tortuous path provided within the trapping housing promotes release of the sand from the wind passing through the housing and screens at the exits block egress of the sand.

PB80-229016 PC **A03**/MF **A01**
Geological Survey, Menlo Park, CA.

MULAP2: A MUlti-Linear Analysis Program for Ground Motion Studies of Horizontally Layered Systems.
Final rept.,
Albert T. F. Chen. Aug 80, 46p USGS-GD-80-005

A computer program that analyzes the nonlinear, dynamic response of horizontally layered systems is presented. The program utilizes a lumped-mass discretization approach and the step-by-step integration procedure, and treats the response of the layered system as piece-wise linear. In addition to being capable of considering a broad class of specified stress-strain relationships through the multi-linear approximation, the program can also take into account the degradation behavior and different soil models. These soil models include the Iwan model, the Masing-Michigan model, and the Pyke model. Organizational features and various options of the program are described. The use of the program is illustrated. FORTRAN listing and sample input/output are also included.

8N. Terrestrial Magnetism

AD-A088 234/0 PC **A03**/MF **A01**
Air Force Global Weather Central Offutt AFB NE
Geomagnetic Index Calculation and Use at AFGWC,
Robert D. Prochaska. Apr 80, 34p Rept no. AFGWC/TN-80/002

At Air Force Global Weather Central (AFGWC) several geomagnetic indices to specify the state of the magnetosphere were used. In this paper it introduces the indices of geomagnetic activity most commonly in use by DOD agencies. It discuss the procedures used at AFGCW to compute the indices and briefly describe the uses of each one.

AD-A088 463/5 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Storm Associated Protonospheric Depletion and Recovery,
L. Kersley, and J. A. Kolbuchar. 5 Oct 79, 8p
Rept no. AFGL-TR-80-0234
Pub. in Planetary and Space Science, v28 p453-458 1980.

No abstract available.

PB80-852304 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Telluric Currents. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 158p
NERACIAANT0684
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles and research studies in this bibliography discuss telluric currents, ground impedance measurements, telluric soundings, as well as other implications of electric earth currents on geomagnetic and geoelectric measurements. (Contains 128 citations.)

PB80-852312 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Telluric Currents. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 106p
NERACUSGNT0684
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles and research studies in this bibliography discuss telluric currents, ground impedance measurements, telluric soundings, as well as other implications of electric earth currents on geomagnetic and geoelectric measurements. (Contains 085 citations.)

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A087 954/4 PC **A02**/MF **A01**
Army Electronics Research and Development Command Fort Monmouth NJ Electronics Technology and Devices Lab
Design, Fabrication and Evaluation of Low Cost Diode Oscillator for Millimeter Waves.
Research and development technical rept.,
Edmund E. Malecki, and Harold Jacobs. Apr 80, 18p Rept no. DELET-TR-80-8

There are urgent requirements for millimeter-wave oscillators in the range of 60 GHz, particularly for local oscillators, receivers, and low power transmit/receive applications such as the self-oscillating mixer. This report describes the design, fabrication and evaluation of a low cost Gunn diode oscillator structure where the diode is placed adjacent to a dielectric waveguide, which in turn, provides output coupling for radiation. Ten milliwatt output power was obtained from a diode at a frequency of 60 GHz. (Author)

AD-A088 063/3 PC **A04**/MF **A01**
Hoffman (P R) Co Carlisle PA
Automated X-Ray Orientation for Quartz Crystal Resonators.
Interim rept. no. 1, 1 Jul-31 Dec 79,
Robert W. Birrell, Robert J. Valihura, John L. Chambers, Myron A. Pugh, and S. Thomas Workman. Jul 80, 51p DELET-TR-79-0254-1
Contract DAAK20-79-C-0254
Prepared in cooperation with Advanced Research and Applications Corp., Sunnyvale, CA.

The major objective of this program is to develop an automated X-ray orientation system which is capable of measuring the angles of cut of doubly rotated cuts of quartz (SC cut) to seconds of arc on a production basis. Precise measurement of Laue spots is used in conjunction with laser crystal surface measurements to determine the angle of cut. The entire procedure is under control of a dedicated mini-computer. A second objective is to angle correct the measured crystals. Several techniques are being studied to replace the conventional laboratory type correction procedure. (Author)

AD-A088 075/7 PC **A02**/MF **A01**
Illinois Univ At Urbana-Champaign Electromagnetics Lab
Investigation of Quasi-Optical Integrated Circuits and Electromagnetic Scattering and Radiation Problems.
Final rept. 1 Mar 77-31 May 80,
Raj Mittra. Jul 80, 7p ARO-14686.9-EL
Grant DAAG29-77-G-0111

A brief summary of a three-year investigation of waveguides, passive components, active circuits and antennas for millimeter waves is presented. Research concentrated entirely on low loss, low cost and lightweight dielectrics that provide an alternative choice to metallic media which become lossy and expensive at millimeter wavelengths. The summary is supplemented by a complete listing of reports and journal publications resulting from the research. (Author)

AD-A088 286/0 PC **A03**/MF **A01**
Frequency Electronics Inc New Hyde Park NY
Vibration Resistant Quartz Crystal Resonators.
Research and development technical rept. 27 Aug 79-27 Feb 80,
B. Goldfrank, and A. Warner. Jul 80, 36p DELET-TR-79-0272-1
Contract DAAK20-79-C-0272

The objectives of this investigation are to provide doubly rotated quartz crystal resonators that exhibit fast warm-up and low 'g' sensitivity. Warm-up is to be on the order of 1 PP10 to the 9th power in three minutes. The 'g' sensitivity is to be 1 PP10 to the 10th power maximum in any axis. (Author)

AD-A088 350/4 PC **A02**/MF **A01**
Cornell Univ Ithaca NY School of Electrical Engineering
Initial Study of Ballistic Effects for the Operation of GaAs FET Devices.
Final rept. Mar 79-Feb 80,
L. F. Eastman. Jul 80, 19p
Contract N00014-79-C-0290, ARPA Order-3720

Ballistic electron motion at high velocity in the (100) direction in GaAs at both 77 K and room temperature has been determined by current-voltage data on thin layers. Molecular beam epitaxial abrupt layers .4-.5 microns thick with N+ ohmic contacts on both sides, have been tested, and ballistic motion occurs below .5V applied voltage. Layers with a donor density of 1 x 10 to the 15th power/cc, and layers with an acceptor density of 1 x 10 to the 15th power/cc both yield space charge limited current data to agree with the corresponding ballistic transport models developed. Average electron velocity values five times higher than that obtainable in a standard FET are now possible for both 77 K and room temperature in such ballistic electron motion. Although the standard FET geometry, even with short gates, is precluded by thick depletion layers into lightly doped layers, from both the exposed surface and the interface with the semi-insulating substrate, it has been concluded that a ballistic electron transistor with a geometry similar to that of the permeable base transistor is possible for very high speed, high frequency, low noise performance. (Author)

AD-A088 378/5 PC **A02**/MF **A01**
Science Applications Inc La Jolla CA
Analytic Approaches to Unstable Resonators.
Final rept.,
J. Nagel, and D. Rogovin. Jun 80, 16p AFOSR-TR-80-0623
Contract F49620-79-C-0027

The marginally stable regime has been distinguished from the unstable regime both qualitatively and quantitatively. New asymptotic techniques for solving the Fresnel-Kirchoff equation for marginally stable resonators were obtained. The method is analytical in nature and yields excellent predictions for the modes and losses of such cavities. Numerical results for both marginally stable and marginally unstable cavities are presented. In addition, conditions for the suitability of using empty resonator modes to describe gain filled cavities have been derived. This deviation is based on manipulations of the differential equation describing gain filled cavities in Hankel transform space. The result is an ordinary, linear Fresnel-Kirchoff integral equation with gain renormalized Fresnel number and eigenvalue. (Author)

AD-A088 450/2 MF **A01**
Bendix Corp Baltimore MD Communications Div
Tactical Miniature Crystal Oscillator.
Semiannual rept. 1 Apr-1 Oct 79,
D. L. Harton, and D. Brown. Aug 80, 101p
DELET-TR-78-2990-2
Contract DAAB07-78-C-2990
Availability: Microfiche copies only.

This report describes the advanced development of a fast warmup Tactical Minature Crystal Oscillator (TMXO). The intended use of this TMXO is as a precision frequency/time reference in advanced communications, navigation and position location systems. The present effort is a continuation of work based on the demonstrated feasibility on previous contracts.

AD-A088 504/6 PC **A02**/MF **A01**
Texas Univ At Austin Dept of Chemistry

Semiconductor Electrodes. 30. Spectral Sensitization of the Semiconductors n-TiO2 and n-WO3 with Metal Phthalocyanines.
Technical rept. 1 Sep 79-31 Aug 80,
Alain Giraudeau, Fu-Ren F. Fan, and Allen J. Bard. 2 Jan 80, 14p Rept no. TR-7
Contract N00014-78-C-0592
Pub. in Jnl. of the American Chemical Society, v102 n16, 30 Jul 80. See also AD-A088 507.

No abstract available.

AD-A088 518/6 PC A03/MF A01
Thomas Electronics Inc Wayne NJ
Phosphor-Penetration Color Cathode-Ray Tube.
Final rept. 1 Jul 74-30 Jun 79,
Emil Sanford. Jun 79, 49p WO-373, DELET-TR-74-C-0605-F
Contract DAAB07-74-C-0605

In a 16-in.-diameter voltage-penetration-type color-CRT a metallic mesh is mounted in proximity to the phosphor layer in order to isolate the switched high-voltage fields applied to the phosphor-screen from the magnetic deflection zone. Electron-optical analysis predicts the degree of geometric distortion over the switching range of 10-20 kV. Some correction means are suggested. Objective goals for resolution and brightness are quantitatively examined. The mechanical design is also described. (Author)

BNL-27854 PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Cooling and Electrical Excitation of 100 M Superconducting Power Transmission Cables.
E. B. Forsyth, R. J. Gibbs, J. E. Jensen, and A. J. McNerney. 1980, 5p CONF-800631-9
Contract AC02-76CH00016
International cryogenic engineering conference, Genoa, Italy, 3 Jun 1980, Portions of document are illegible.

The design of a test facility for superconducting power transmission cables is described. The cryogenic portion consists of a screw compressor, cold box with turbine expanders, 100 m of transfer line and 100 m of cable enclosure. The complete cryogenic system has been operated and performance figures are given. The cables will be operated at voltage and current by electrical equipment which has mostly been installed and tested. The interface between the low-temperature cables and the outside are four termination bushings which are under construction; a brief description is included. (ERA citation 05:030617)

CERN-79-04 PC A11/MF A01
European Organization for Nuclear Research, Geneva (Switzerland).
Compilation of Radiation Damage Test Data. I. Cable Insulating Materials.
H. Schoenbacher, and A. Stolarz-Izycka. 18 Jun 79, 238p
In English, French.
U.S. Sales Only.

This report summarizes radiation damage test data on commercially available organic cable insulation and jacket materials: ethylene-propylene rubber, Hypalon, neoprene rubber, polyethylene, polyurethane, polyvinylchloride, silicone rubber, etc. The materials have been irradiated in a nuclear reactor to integrated absorbed doses from 5 X 10 exp 5 to 5 X 10 exp 6 Gy. Mechanical properties, e.g. tensile strength, elongation at break, and hardness, have been tested on irradiated and non-irradiated samples. The results are presented in the form of tables and graphs, to show the effect of the absorbed dose on the measured properties. . (Atomindex citation 11:508101)

EPRI-EL-1327 PC A05/MF A01
Hoppel (William A.), Fort Washington, MD.
Study of Drifting, Charged Aerosols from HVDC Lines. Final Report.
W. A. Hoppel. Jan 80, 78p

A study of the mechanism by which atmospheric aerosol particles are charged in the vicinity of a unipolar HVDC line and a numerical analysis that predicts the magnitude of the wind-driven current carried by particulates was conducted. The major elements of the study are the following: equations for the rate of charging of particles in strong electric fields and unipolar ion environments are developed and numerical solutions are presented; the electrical mobility of charged particles is determined; numerical solutions to the equations that govern the electric field and ion density in the vicinity of a unipolar line for wind speeds of 0, 5, and 10 m/sec in the absence of aerosols are presented; and a numerical analysis of the magnitude of charge transferred to the aerosol as it is advected past the HVDC line as a function of wind speed is carried out for three aerosol size distribution models and three fog models. The results for a 400 kV unipolar HVDC line giving off 2.3 mu amp per m predicts that 3 to 5% of the corona current will be transferred to aerosols in clean rural air, 4 to 12% in moderately polluted air, and possibly as much as 45% in highly polluted air; higher transfer rates are predicted for fogs. Downwind the space charge and resulting electric fields are one to two orders of magnitude greater than the fair-weather background values. (ERA citation 05:030613)

EPRI-EL-1349 PC A10/MF A01
General Electric Corporate Research and Development, Schenectady, NY.
Light-Triggered Thyristors for Electric Power Systems (Phase 2). Interim Report.
V. A. K. Temple, and B. Jackson. Mar 80, 212p

The development of light triggered thyristors suitable for HVDC applications is discussed. Three devices were constructed with 5, 4, and 2 amplifying stages, respectively, with several sub-variations. Of these the 4 amplifying stage GE3 type D device and all variations (A, B, and C) of the two stage GE4 design proved sufficiently reliable for the replacement of the normal, electrically triggered 2.6 kV HVDC cell. These devices proved the usefulness of the n exp + alignment band, a feature design to ensure even turn-on, and the interrupted n exp + metal, a feature to enhance rapid spreading away from the initial turn-on line. Important device characteristics other than a typical 160A/mu sec or better di/dt at 105 exp 0 C and 1800 volts include the following: (1) typical forward breakdown voltage of 2900 volts; (2) typical reverse breakdown voltage of 3100 volts; (3) dv/dt capability of 2000V/ mu sec to 2200 volts; (4) forward drop at 105 exp 0 C, 1000 amperes of 1.3 volts and, finally, (5) a typical photo threshold of 10 to 20 nanojoules of incident photo energy. Surge capability and other device ratings are similar to the original electrically fired device. It is also significant that both the fabrication and packaging of these devices took place in a production facility and that the light triggered thyristor could be fabricated with the same process, apart from the extra sensitivity etch, as the regular electrically triggered device. Further, the package is a relatively simple one which requires only a few cents worth of extra parts. (ERA citation 05:030615)

GEPP-TIS-494 PC A02/MF A01
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Molybdeum Etching Rate Studies.
R. K. Spears. 22 May 80, 13p
Contract EY-76-C-04-0656

The etching characteristics of vacuum tube molybdenum inner sleeves and frames were determined for both dilute and strong acid. For the diluted acid, a linear relationship between percent weight removed and time was established, whereas, for the strong acid, a quadratic relationship was established. The inner sleeve, fabricated from arc cast molybdenum, etched faster than the frame that was hydroformed from powder metallurgical processed molybdenum sheets. Based on these studies, an etch time of 15 seconds with the diluted etchant was selected as an optimum time. This time period allowed sufficient etching without causing a fibrous surface structure on the inner sleeve. (ERA citation 05:029280)

NIIEFA-B-0343 PC A02/MF A01
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow.
Residual Field in Superconducting Magnets.
B. N. Zhukov, V. N. Lebedev, and I. A. Mozalevskii. 1977, 7p
In Russian.
U.S. Sales Only.

The method and the calculation results of the residual field and its harmonic composition for the superconducting coils of different thickness and different field gain by an iron screen are considered. (Atomindex citation 09:408352)

N80-29572/8 PC A05/MF A01
AEG-Telefunken, Heilbronn (Germany, F.R.). Serienprodukte A.G.
Small Signal and Noise Modeling of UHF Devices.
Final Report.
M. Ohler. Dec 79, 76p BMFT-FB-T-79-65, ISSN-0340-7608
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Methods for the measurement and computer simulation of small signal and noise parameters in the frequency range from 100 to 1300 MHz were developed. Bipolar p-n-p transistors in the common base configuration in 'JEDEC TO 50' casings were primarily investigated. By the application of the correlation matrix method it was possible to analyze the noise behavior of complex equivalent circuits. The computer programs used make it possible to deal with computational and application problems. However, the noise parameters of transistors with high resistivity collector regions cannot be accurately determined by indirect methods since the collector charging time could not be measured with sufficient accuracy.

N80-29603/1 PC A05/MF A01
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e. V., Munich (Germany, F.R.). Inst. fuer Festkoerpertechnologie.
Semiconductor Technology of Ion Implanted Silicon Devices.
Final Report, Mar. 1978.
J. Goetzlich, A. Heuberger, H. Kranz, B. Schubert, and F. Soller. Dec 79, 91p BMFT-FB-T-79-81
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The influence of ion implantion on various processes in the production of bipolar silicon devices was investigated. Results show that the oxidation behavior of ion implanted silicon layers exhibits an enhancement of the oxidation rate depending on ion species, ion energy, and ion dose. An evaluation of the segregation coefficient of As at the SiO2/Si interface demonstrates that segregation stronly affects the oxidation rate. Evaluation of the profile of knocked-on oxygen and nitrogen atoms from SiO2 and Si3N4 layers on silicon substrates shows that the dose of the knocked-on atoms is approximately as high as the dose of the primary ions if the thickness of the layer corresponds to the projected range of the implanted ions. Measurements of the pipe density of n-p-n structures in epitaxial layers with implanted subcollectors shows that arsenic as a subcollector dopant causes fewer cristallographic defects than antimony. The use of experimental results on oxidation rate and segregation coefficient for the development of silicon devices by means of process modeling is discussed.

PAT-APPL-6-156 441 PC A02/MF A01
Department of the Navy Washington DC
Intense Ion Beam Generation with an Inverse Reflex Tetrode (IRT).
Patent Application,
Christos A. Kapetanakos, John A. Pasour, Redge A. Mahaffey, Jeffry Golden, and Spencer J. Marsh. Filed 4 Jun 80, 20p AD-D007 421/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An inverse reflex tetrode (IRT) for producing an intense pulsed beam of ions includes a real cathode having a curved or conical surface which is substantially transparent to the ions; first anode and second anode, or grid, which are spaced apart and are at the same potential, the first anode being between the real cathode and the second anode and having a curved or conical surface approximately parallel to the surface of the real cathode, and also being formed from a dielectric material such as polyethylene; a curved or conical hollow anode

stalk which supports both anodes; and a virtual cathode which is formed by electrons that are emitted by the real cathode and pass through the first anode. The real cathode and first and second anodes are enclosed in a vacuum chamber and are immersed in an applied external magnetic field. The IRT receives an electrical pulse from a high-voltage pulse generator. The real cathode emits electrons which accelerate toward the first anode, pass through the first anode and form a virtual cathode between the first and second anodes. Most of the electrons oscillate between the virtual cathode and the real cathode and form a plasma sheath on the surfaces of the first anode. Some ions from the plasma propagate toward the second anode, and some ions propagate toward the real cathode. The ions arrive at the second anode with zero velocity, while the other ions pass through the real cathode and form a propagating ion beam. (Author)

PAT-APPL-6-158 006 PC **A02**/MF **A01**
Department of the Navy Washington DC
Transformer Core Clamp.
Patent Application,
Benjamin Allen, and Noel Williams. Filed 9 Jun 80, 9p AD-D007 420/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This report describes a transformer core clamp that increases both the clamping force applied to a center leg of the transformer core and the shock resistance of the transformer core. The clamp is constructed with opposed clamp plates on the outward facing sides of opposed core members. The outward facing sides of the core members are tapered from the midsection of the core member to the ends of the core members. The plates are connected by tension members and fasteners which are adjustable to tighten the plates against the core members. The tension members are positioned at opposed ends of the core and on either side of a core midsection adjacent the center leg of the core. The clamp plates abut the midsection of the core members and, with the end tension members, act as a lever arm to exert increased compressive force on the midsection of the core members adjacent the center leg. The midsection tension members apply additional compressive force on the center leg to reduce the air gap and the noise of the transformer and increase the shock resistance of the core thus preventing misalignment of the core members. (Author)

PAT-APPL-6-161 256 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Photocapacitive Image Converter.
Patent Application,
W. E. Miller, A. Sher, and Y. H. Tsuo. Filed 20 Jun 80, 14p N80-28635/4, NASA-CASE-LAR-12513-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Apparatus is described for converting a radiant energy image into corresponding electrical signals including an image converter. The image converter includes a substrate of semiconductor material, an insulating layer on the front surface of the substrate and an electrical contact on the back surface of the substrate. A series of parallel transparent conductive stripes is on the insulating layer with a processing circuit connected to each of the conductive stripes for detecting the modulated voltages generated. In a first embodiment of the invention, a modulated light stripe, perpendicular to the conductive stripes scans the image converter. The resulting modulated signals generated on the conductive stripes are detected by the processing circuits to produce signals that represent the image focused on the image converter. In a second embodiment of the invention a second insulating layer is deposited over the conductive stripes, and a second series of parallel transparent conductive stripes perpendicular to the first series is on the second insulating layer. A different frequency current signal F sub n is applied to each of the second series of conductive stripes, and a modulated image is applied to the image converter. The resulting signals detected by the processing circuits represent the image.

PAT-APPL-6-162 702 PC **A02**/MF **A01**
Department of the Navy Washington DC
Slow-Wave Wideband Cyclotron Amplifier.
Patent Application,
Phillip A. Sprangle, and Victor L. Granatstein. Filed 24 Jun 80, 9p AD-D007 415/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A slow-wave, cyclotron-type, travelling-wave-tube amplifier in which the beam-wave interaction is the result of a Weibel-type instability. The travelling wave is slowed down in its propagation through the waveguide by a dielectric liner located on the inner wall of the waveguide. The bunching mechanism is the result of the V x B Lorentz force. (Author)

PATENT-4 213 073 Not available NTIS
Department of the Navy Washington DC
Rod Pinch Diode.
Patent,
Redge A. Mahaffey, Shyke A. Goldstein, Jeffry Golden, and Gerald Cooperstein. Filed 20 Sep 78, patented 15 Jul 80, 7p AD-D007 426/0, PAT-APPL-944 238
Supersedes PAT-APPL-944 238-78, AD-D005 463.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses an improved diode for forming an intense electron beam and propagating the beam. The diode includes a cathode having a bore, and a rod-shaped anode having a media. tapered section which extends, approximately coaxially, through the bore of the cathode. The anode tapers at or near the cathode and is formed from electrically conductive material. The cathode is made from a material which rapidly emits electrons during the early stage of an applied voltage pulse. The electrons strike the anode and form a plasma thereon. Sufficient anode current and the formation of sufficient anode plasma affect the magnetic and electric fields to pinch the electrons closer to each other and to force the electron beam to propagate along the anode and away from the cathode and voltage supply. The tapered section of the anode increases the velocity of the pinch and the density of the electron beam.

PB80-226699 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Breakdown Between Bare Electrodes with an Oil-Paper Interface.
Interim rept. Jun 79-Mar 80,
Edward F. Kelley, and Robert E. Hebner, Jr. Jun 80, 34p NBSIR-80-2071
Sponsored in part by Department of Energy, Washington, DC. Div. of Electric Energy Systems.

This report describes experimental measurements of the location of electrical breakdown in a composite insulating system. For these measurements a paper sample was mounted so that it connected the two electrodes. Electrode structures ranging from plane-plane to sphere-sphere were used. The electrode-paper system was tested in oil in an attempt to determine the properties of an oil-paper interface. The data indicated that in a carefully prepared system the breakdown will not necessarily occur at the interface. In addition, it was found that the breakdown voltages were not significantly lower for those breakdowns which occurred at the interface than for those which did not. It was noted that if the paper interface was not dried or if many gaseous voids were left in or on the paper, the breakdown will regularly occur at the interface and at a lower voltage.

PB80-850852 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Acoustic Surface Waves. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 158p NERACIAANT0253
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles cover the theory, and application of acoustic surface waves, as well as discussions of modes of operation. (Contains 168 citations.)

PB80-850860 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Acoustic Surface Waves. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 159p NERACEI NT0253
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles cover the theory, and application of acoustic surface waves, as well as discussions of modes of operation. (Contains 166 citations.)

PB80-851439 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cathode Ray Tubes. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 222p NERACUSGNT0593
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on new capabilities of cathode ray tubes, such as color or monochromatic displays, editing, graphics, on board floppy disks, digital cassettes, and built-in microprocessors. Applications of cathode ray tubes in aircraft, computer, video and electron tubes are also discussed. (Contains 140 citations.)

PB80-851447 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cathode Ray Tubes. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 105p NERACEI NT0593
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on new capabilities of cathode ray tubes, such as color or monochromatic displays, editing, graphics, on board floppy disks, digital cassettes, and built-in microprocessors. Applications of cathode ray tubes in aircraft, computer, video and electron tubes are also discussed. (Contains 110 citations.)

PB80-852320 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Voltage Controlled Oscillators. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 69p NERACUSGNT0537
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss various types of voltage controlled oscillators, and their applications to the Viking space program, monolithic phase-locked loops, discriminators, etc. (Contains 059 citations.)

PB80-852338 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Voltage Controlled Oscillators. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 100p NERACEI NT0537
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss various types of voltage controlled oscillators, and their applications to the Viking space program, monolithic phase-locked loops, discriminators, etc. (Contains 109 citations.)

PB80-852411 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.

Vidicons. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 147p
NERACIAANT0609
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles in this bibliography discuss the latest developments in Vidicons, as well as detailed discussions of the design, test, development, and application of these Vidicons to such areas as nuclear track photometry, photoelectronic imaging, the detection of natural resources, etc. (Contains 123 citations.)

PB80-852429 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vidicons. November, 1971-June, 1980 (Citations from the NTIS Data Base).
Rept. for Nov 71-Jun 80,
Howard L. Ogushwitz. Jun 80, 209p
NERACUSGNT0609
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles in this bibliography discuss the latest developments in Vidicons, as well as detailed discussions of the design, test, development, and application of these Vidicons to such areas as nuclear track photometry, photoelectronic imaging, the detection of natural resources, etc. (Contains 179 citations.)

PB80-852437 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vidicons. July, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jul 76-May 80,
Howard L. Ogushwitz. Jun 80, 59p
NERACEDBNT0609
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles in this bibliography discuss the latest developments in Vidicons, as well as detailed discussions of the design, test, development, and application of these Vidicons to such areas as nuclear track photometry, photoelectronic imaging, the detection of natural resources, etc. (Contains 040 citations.)

PB80-852445 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vidicons. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 157p NERACEI NT0609
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles in this bibliography discuss the latest developments in Vidicons, as well as detailed discussions of the design, test, development, and application of these Vidicons to such areas as nuclear track photometry, photoelectronic imaging, the detection of natural resources, etc. (Contains 157 citations.)

PB80-853096 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Varistors. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Aug 80, 33p
NERACUSGNT0244
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory, production, and applications of various types of varistors. (Contains 023 citations.)

PB80-853740 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Piezoelectric Transducers. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 53p
NERACEDBNT0520
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which cover the technology and applications of piezoelectric transducers. Applications include microwave equipment, integrated optics, holography, acoustic surface wave devices, detectors, and memory devices. (Contains 048 citations.)

PB80-853757 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Piezoelectric Transducers. July, 1975-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jul 75-Jun 80,
Lawrence H. Marcus. Jun 80, 217p
NERACUSGNT0520
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which cover the technology and applications of piezoelectric transducers. Applications include microwave equipment, integrated optics, holography, acoustic surface wave devices, detectors, and memory devices. (Contains 200 citations.)

PB80-853849 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cathode Ray Tubes. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 64p NERACEDBNT0593
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning new capabilities of CRT's, such as color or monochromatic displays, editing, graphics, on board floppy disks, digital cassettes, and built-in microprocessors. Applications of CRT's in aircraft, computers, video and electron tubes, are also discussed. (Contains 085 citations.)

PB80-854102 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Piezoelectric Transducers. September, 1976-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Sep 76-Jun 80,
Lawrence H. Marcus. Jun 80, 195p NERACEI NT0520
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which cover technology and applications of piezoelectric transducers. Applications include microvave equipment, integrated optics, holography, acoustic surface wave devices, detectors and memory devices. (Contains 187 citations.)

PB80-854169 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ceramic Capacitors. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 40p
NERACUSGNT0506
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography discusses manufacturing methods and techniques as well as applications of ceramic capacitors. Performance tests and failure rates are also presented. (Contains 040 citations.)

PB80-854565 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Piezoelectric Transducers. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Lawrence H. Marcus. Jun 80, 132p
NERACIAANT0520
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which cover the technology and applications of piezoelectric transducers. Applications include microwave equipment, integrated optics, holography, acoustic surface wave devices, detectors and memory devices. (Contains 165 citations.)

PB80-854714 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrical Point Contacts. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 64p NERACEI NT0869
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, test, and development of various types of electrical point contacts. Also included is a discussion of the application of point contacts to such devices as detector receivers of millimeter radiation, mixers, frequency dawn converters, etc. (Contains 057 citations.)

PB80-855695 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thyristors. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 146p NERACIAANT0673
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations covering information on development, manufacturing and applications of thyristors. Thyristors used in electrical switches and control devices are also included. (Contains 070 citations.)

PB80-855703 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thyristors. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 167p
NERACUSGNT0673
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations covering information on development, manufacturing and applications of thyristors. Thyristors used in electrical switches and control devices are also included. (Contains 071 citations.)

PB80-855711 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thyristors. October, 1978-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Oct 78-Jun 80,
Walter Van Put. Jun 80, 189p NERACEI NT0673
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations covering information on development, manufacturing and applications of thyristors. Thyristors used in electrical switches and control devices are also included. (Contains 168 citations.)

PB80-855729 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thyristors. January, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-May 80,
Walter Van Put. Jun 80, 189p
NERACEDBNT0673
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations covering information on development, manufacturing and applications of thyristors. Thyristors used in electrical switches and control devices are also included. (Contains 096 citations.)

PB80-856016 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrical Insulating Materials. October, 1977-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Oct 77-Jun 80,
William V. Sassi. Jun 80, 207p NERACEI NT0940
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe various materials, and methods for electrical insulation. Also included is a discussion of the testing, and development of existing insulation materials. Among the types of materials discussed are polymer materials, composite boride coatings applied by the electrodeposition techniques, and silicon carbide composite coatings. (Contains 200 citations.)

PB80-856024 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrical Insulating Materials. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 164p
NERACEDBNT0940
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe various materials, and methods for electrical insulation. Also included is a discussion of the testing, and development of existing insulation materials. Among the types of materials discussed are polymer materials, composite boride coatings applied by the electrodeposition techniques, and silicon carbide composite coatings. (Contains 138 citations.)

PB80-856032 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrical Insulating Materials. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
William V. Sassi. Jun 80, 138p
NERACIAANT0940
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe various materials, and methods for electrical insulation. Also included is a discussion of the testing, and development of existing insulation materials. Among the types of materials discussed are polymer materials, composite boride coatings applied by the electrodeposition techniques, and silicon carbide composite coatings. (Contains 136 citations.)

PB80-856958 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Permanent Magnets. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jun 80, 50p NERACIAANT0345
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on development and applications of permanent magnets, such as AC and DC motors, induction step motors, flow meters, bearings, communications and others. Fabrication, measuring, aging, testing physical and mechanical properties of permanent magnets are also discussed. (Contains 071 citations.)

PB80-856966 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Permanent Magnets. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 179p
NERACUSGNT0345
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on development and applications of permanent magnets, such as AC and DC motors, induction step motors, flow meters, bearings, communications and others. Fabrication, measuring, aging, testing physical and mechanical properties of permanent magnets are also discussed. (Contains 165 citations.)

PB80-856974 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Permanent Magnets. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 176p NERACEI NT0345
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on development and applications of permanent magnets, such as AC and DC motors, induction step motors, flow meters, bearings, communications and others. Fabrication, measuring, aging, testing physical and mechanical properties of permanent magnets are also discussed. (Contains 162 citations.)

PB80-856982 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Permanent Magnets. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 148p
NERACEDBNT0345
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on development and applications of permanent magnets, such as AC and DC motors, induction step motors, flow meters, bearings, communications and others. Fabrication, measuring, aging, testing physical and mechanical properties of permanent magnets are also discussed. (Contains 110 citations.)

PB80-857311 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrical Cables. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jun 80, 66p NERACIAANT0600
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information cited on applications and development of electrical coaxial, conduit cables used in communications and power transmission. The fabrication of various cables with different insulation materials such as low-loss, superconducting and earthquake resistant cables are also included. (Contains 039 citations.)

PB80-857329 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrical Cables. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 210p
NERACUSGNT0600
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information cited on applications and development of electrical coaxial, conduit cables used in communications and power transmission. The fabrication of various cables with different insulation materials such as low-loss, superconducting and earthquake resistant cables are also included. (Contains 164 citations.)

PB80-857337 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrical Cables. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 195p NERACEI NT0600
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information cited on applications and development of electrical coaxial, conduit cables used in communications and power transmission. The fabrication of various cables with different insulation materials such as low-loss, superconducting and earthquake resistant cables are also included. (Contains 145 citations.)

PB80-857345 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrical Cables. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 196p
NERACEDBNT0600
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information cited on applications and development of electrical coaxial, conduit cables used in communications and power transmission. The fabrication of various cables with different insulation materials such as low-loss, superconducting and earthquake resistant cables are also included. (Contains 148 citations.)

PB80-858210 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thick Films. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Aug 80, 74p
NERACIAANT0234
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design and application of thick film resistors, thick film conductors, and other thick film devices. (Contains 066 citations.)

PB80-858228 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thick Films. April, 1971-June, 1980 (Citations from the NTIS Data Base).
Rept. for Apr 71-Jun 80,
Howard L. Ogushwitz. Aug 80, 209p
NERACUSGNT0234
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design and application of thick film resistors, thick film conductors, and other thick film devices. (Contains 200 citations.)

PB80-858236 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thick Films. February, 1976-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Feb 76-Jun 80,
Howard L. Ogushwitz. Aug 80, 191p NERACEI NT0234
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design and application of thick film resistors, thick film conductors, and other thick film devices. (Contains 200 citations.)

SRD-78-149 PC **A13**/MF **A01**
General Electric Corporate Research and Development, Schenectady, NY.
Development of a Hvdc Prototype Breaker. Final Report, November 5, 1975-October 1, 1978.
1978, 296p
Contract AC01-76ET29054

The significant design features of a high-voltage dc (hvdc) circuit breaker based on the commutation concept have been developed. Tests of components indicate the breaker is capable of interrupting a fault current of 10 kA on a 400 kV system and absorbing up to 10 MJ of system energy without generating more than 1.6 per unit (P.U.) voltage on the system. Interactions of the breaker with a three-terminal network were studied, using a

system simulator. An ultrafast hydraulic actuator system was developed for this program. It enables the breaker, which is independent of terminal actions, to respond rapidly to a trip signal and to initiate the current limiting process within 5 ms after receipt of a trip signal. A new hydraulic valve, operated by a repulsion coil, minimizes the delay before motion begins. Interruption will occur in series-connected vacuum interrupters chosen because of their unique ability to interrupt high dI/dt before current zero followed by a high rate of rise of recovery voltage (RRRV) with a short contact gap. A 400 kV circuit breaker is estimated to require eight breaks in series. Only a single break has been tested as part of this program because of the scale and cost required for multibreak tests. System energy will be absorbed by zinc-oxide-based surge suppressors included as an integral part of the breaker. Their extremely nonlinear current-voltage characteristic allows them to be operated with no series gaps. The overall design is envisioned as a dead tank type using pressurized SF sub 6 gas as a dielectric medium. The actuator and all contol functions are located at ground potential, with easy access for inspection or adjustment. Operational specifications such as duty cycle and operating temperature range have been carried over from NEMA standards for ac power circuit breakers where applicable. (ERA citation 05:030616)

9E. Computers

AD-A087 975/9 MF **A01**
Naval Postgraduate School Monterey CA
The Design of a Secure File Storage System.
Master's thesis,
Edward James Parks. Dec 79, 123p
Availability: Microfiche copies only.

A design for a secure, multi-user, File Storage System is developed. This design, incorporating a concurrently developed Security Kernel, provides a multilevel secure flexible file storage serving a distributed system of dissimilar computers. The Security Kernel is responsible for non-discretionary (e.g., classification and clearance) security and the File Storage System Supervisor is responsible for discretionary (e.g., 'need to know') security. Multilevel security is achieved by the controlled access to consolidated file storage by Host computer systems. Multiprogramming of surrogate Supervisor processes operating on behalf of the Host computer systems provides for system efficiency. A segmented memory at the Supervisor level allows controlled data sharing among authorized users. System integrity is independent of the internal security controls (or lack of them) in the distributed systems; the File Storage System prevents system-wide security side effects. A loop free structure along with system simplicity and robustness are design characteristics. (Author)

AD-A087 996/5 PC **A12**/MF **A01**
Computer Corp of America Cambridge MA
Fundamental Algorithms for Concurrency Control in Distributed Database Systems.
Final technical rept. Jul 79-Jan 80,
Philip A. Bernstein, and Nathan Goodman. May 80, 266p RADC-TR-80-158
Contract F30602-79-C-0191

No abstract available.

AD-A087 997/3 PC **A99**/MF **A01**
Naval Research Lab Washington DC
Software Engineering Principles.
Course notebook,
Louis J. Chmura, Paul Clements, Constance L. Heitmeyer, and Kathryn L. Heninger. Jul 80, 638p
Supersedes report dated Jun 79, AD-A078 005. Prepared in cooperation with and presented at Naval Postgraduate School, 14-25 Jul 80, Monterey, CA.

This is the notebook from the updated edition of the well-received course originated by the Naval Research Laboratory (NRL) and taught annually for the past five years. It is a two-week technical course for DoD personnel managing a software project or designing software. The purpose of the course is to improve the participant's ability to evaluate software requirements, specifications, design, correctness, and maintainability. Its purpose is not to transform the participant into an expert software designer. The course concentrates on technical problems of software design. It introduces generally accepted design practices, as well as software design research that may result in practical design practices in the near future. Topics covered include program families, information-hiding modules, hierarchical structures, abstract interfaces, formal specifications, responses to undesired events, documentation, and cooperating sequential processes. (Author)

AD-A088 021/1 PC **A03**/MF **A01**
INCO Inc McLean VA
USAF Standard Software Base.
Final technical rept. Mar 78-Mar 80,
Gary Kincaid, Richard Hicks, William Fullerton, Gary Morgan, and Brian Wolf. May 80, 38p
INCO/1110-480-FR-16-D(F), RADC-TR-80-184
Contract F30602-78-C-0204

This report describes the work performed to expand the capabilities of the USAF Standard Software Base supporting AN/GYQ-21(V) operations. The report discusses maintenance and improvements made to the baseline system, and the development and implementation of advanced capabilities and services. (Author)

AD-A088 116/9 PC **A02**/MF **A01**
Stanford Univ CA Computer Systems Lab
Some Notes on a DEL Basis for Language-Oriented Operating Systems.
Technical note,
Michael J. Flynn, and Martin Freeman. Nov 79, 21p TN-169, ARO-15877.1-EL
Grants DAAG29-78-G-0205, NSF-MCS76-07682

The concept of a noninterruptable atomic function has been used for describing operating systems. In this note we suggest certain extensions to this model of operating systems for use in language directed architectures (called Directly Executed Languages--DELs). Four categories of functions are defined: absorbed functions, atomic functions, constructed functions, and metalingual functions. A possible scenario as to the relationship between this functional partitioning and operating system routines is described. (Author)

AD-A088 167/2 PC **A05**/MF **A01**
Army Satellite Communications Agency Fort Monmouth NJ
CAT - A Disk Cataloging System for the CP/M Operating System.
Final rept. Jan-May 80,
Richard L. Conn. 4 Aug 80, 78p

The Disk Cataloging System (CAT) described by this document is a utility program which runs on the CP/M operating system, Version 1.4. This system consists of the CAT program itself as a .COM file, the NAMEDISK program as a .COM file, and one or more catalog files (named catname .CAT). It provides an automated method of cataloging the contents of a group of disks and quickly scanning the catalog file so created to determine the disks specified files reside on. This system permits the user to keep a number of distinct catalogs on the same disk and modify the contents of and make queries of each without affecting the others. Wild card specifications are permitted, thereby giving the user to selectively catalog files from other disks and selectively scan a catalog file for entries matching a general specification. For example, by specifying the command string 'CAT *.ASM *.A question mark question mark' the user instruction causes CAT to search the current default catalog file for all assembly language source files on all disks in group A (*.A question mark question mark specifies any disk name in group A with any disk number). Updating of a catalog can be done in a similar fashion. (Author)

AD-A088 186/2 PC **A06**/MF **A01**
Syracuse Univ NY Dept of Industrial Engineering and Operations Research
A Time Dependent Error Detection Rate Model for Software Performance Assessment with Applications.
Interim technical rept. Sep 78-Oct 79,
Amrit L. Goel, and K. Okumoto. May 80, 113p
RADC-TR-80-179
Contract F30602-78-C-0351

The objective of this study was to develop a parsimonious model whose parameters have a physical interpretation, and which can be used to predict various quantitative measures for software performance assessment. With this objective, the behavior of the software failure counting process (N(t), t equal to or greater than zero) has been studied. It is shown that N(t) can be well described by a non-homogeneous Poisson process (NHPP) with a two parameter exponentially decaying error detection rate. Several measures, such as the number of failures by some prespecified time, the number of errors remaining in the system at a future time, and software reliability during a mission, have been proposed in this report. Models for software performance assessment are also derived. Two methods are developed to estimate model parameters from either failure count data or times between failures. A goodness-of-fit test is also developed to check the adequacy of the fitted model. Finally, actual failure data are analyzed from two DOD software systems. One is a large command and control system and the other a Naval data analysis system. (Author)

AD-A088 189/6 PC **A07**/MF **A01**
University of Southern California Marina Del Rey Information Sciences Inst
Microcode Verification Project.
Final technical rept.,
Stephen D. Crocker, Leo Marcus, and Dono van-Mierop. May 80, 149p RADC-TR-80-42
Contract F30602-78-C-0008

Within the scope of this project, a formalism for representing state transitions in a computationally tractable way has been invented, and a proof system based on this formalism has been designed and implemented. The representations of state transitions are called 'state deltas'. The basic proof system has been specialized for proofs about machine language and microcode by the addition of simplification rules for bitstring arithmetic, and by the addition of a translator from the ISPS machine description language to state deltas. Some experimentation with the system has been driven by a preliminary attempt to verify parts of the microcode of the Fault-Tolerant Spaceborne Computer (FTSC). The primary success to date has been the verification of the basic algorithm used for computing floating point square root. (Author)

AD-A088 217/5 PC **A06**/MF **A01**
Army Satellite Communications Agency Fort Monmouth NJ
TFS--The Text Formatting System. A Text Formatter Designed to Run under the CP/M Operating System.
Final rept. May 79-May 80,
Richard L. Conn. 25 Jul 80, 110p

The Text Formatting System (TFS) described by this document is a utility program which runs on the CP/M operating system, Version 1.4. TFS produces a modified listing of the contents of a CP/M text file either on a floppy disk or on a printer page. TFS is a program which interprets control specifications within the text of the file to be formatted and interprets them to produce the formatted listing. These control specifications instruct TFS to perform operations such as centering, underlining, right justification, starting a paragraph, pagination, and others. Unlike other more conventional formatters, however, TFS constructions make up a quasi-programming language. Facilities are included for MACRO definition and application, looping, insertion of data and commands from disk files and incorporation into the document, and interpretive interaction with the use from the console. (Author)

AD-A088 295/1 PC **A02**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Mellon Inst of Science
BMD Reconfigurable Topology Study, DDP Emulation Study.
Final rept. 1 Mar 79-29 Feb 80,
Ronald L. Krutz. 29 Feb 80, 18p
Contract DASG60-79-C-0043

Contents: BUCS-1 System Development--Interrupt Bus Contention Analysis, System Hardware Integration, Monitor Software Development, HLL Sup-

port Development, and Demonstration Application Software; Logic Analysis of DDP Systems--DDP System Logic Analysis, Performance Analysis Techniques, and Logic Analyzer User Interface; Resource Emulation Concept Development-- Resource Emulation - Definition, and Example of Memory Emulation; Signal Processing System Requirements-- Control Processor Requirements, and Data Operator Primitives; Proposed DDP Tasks for BUCS-1.

AD-A088 355/3 PC **A09**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
Laboratory for Computer Science Progress Report 16, 1 July 1978 - 30 June 1979,
Michael L. Dertouzos. 1 Aug 80, 196p Rept no. LCS/PR-16
Contract N00014-75-C-0661

This report summarizes the research performed by the MIT Laboratory for Computer Science from July 1, 1978 to June 30, 1979. (Author)

AD-A088 479/1 PC **A02**/MF **A01**
Purdue Univ Lafayette IN School of Electrical Engineering
MIMD Machine Communication Using the Augmented Data Manipulator Network,
Robert J. McMillen, and Howard Jay Siegel. 1980, 10p AFOSR-TR-80-0580
Grant AFOSR-78-3581
Pub. in Proceedings at the Annual Symposium on Computer Architecture (7th), p51-58 May 80.

No abstract available.

AD-A088 531/9 PC **A07**/MF **A01**
Command and Control Technical Center Washington DC
Generalized Monitoring Facility. Users Manual. Revision 1. Change 2.
Computer systems manual,
Barry M. Wallack, and George H. Gero, Jr. 23 Jul 79, 139p Rept no. CCTC-CSM-UM-246-78-REV-1-2
Change 2 to Rept. no. CCTC-CSM-UM-246-78-REV-1, AD-A072 493. See also Change 1, AD-A072 494.

This report is change 2 to the Generalized Monitoring Facility (Revision 1) Users Manual CSM UM 246-78 (Rev. 1). A list of effective pages to verify the accuracy of this manual is enclosed.

BNL-28070 PC **A03**/MF **A01**
Erasmus Univ., Rotterdam (Netherlands).
LIFT: A Nested Decomposition Algorithm for Solving Lower Block Triangular Linear Programs. Report AMD-859.
D. Ament, J. Ho, E. Loute, and M. Remmelswaal. Jun 80, 26p CONF-800687-1
Contract AC02-76CH00016
Workshop on large-scale linear programming, Laxenburg, Austria, 2 Jun 1980.

Nested decomposition of linear programs is the result of a multilevel, hierarchical application of the Dantzig-Wolfe decomposition principle. The general structure is called lower block-triangular, and permits direct accounting of long-term effects of investment, service life, etc. LIFT, an algorithm for solving lower block triangular linear programs, is based on state-of-the-art modular LP software. The algorithmic and software aspects of LIFT are outlined, and computational results are presented. 5 figures, 6 tables. (ERA citation 05:031428)

CEA-CONF-4631 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
SAR: A Fast Computer for Camac Data Acquisition.
B. Bricaud, J. C. Faivre, and J. Pain. 1979, 3p
CONF-790549-16
Conference on computerized data - acquisition systems in particle and nuclear physics, Santa Fe, NM, USA, 14 May 1979.
U.S. Sales Only.

This paper describes a special data acquisition and processing facility developed for Nuclear Physics experiments at intermediate energy installed at SATURNE (France) and at CERN (Geneva, Switzerland). Previously, we used a PDP 11/45 computer which was connected to the experiments through a Camac Branch highway. In a typical experiment (340 words per event), the computer limited the data acquisition rate at 4 mu sec for each 16-bit transfer and the on-line data reduction at 20 events per second only. The initial goal of this project was to increase these two performances. Previous known acquisition processors were limited by the memory capacity these systems could support. Most of the time the data reduction was done on the host mini computer. Higher memory size can be designed with new fast RAM (Intel 2147) and the data processing can now take place on the front end processor. (Atomindex citation 11:507523)

COO-2383-0071 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Computer Science.
Software Systems Research. Annual Report, November 16, 1979-November 15, 1980.
C. W. Gear, and D. S. Watanabe. 1980, 9p
Contract AS02-76ER02383

Progress made during the last year in the following areas is briefly summarized: ODEs with highly oscillatory solutions, ODEs with discontinuities, multirate methods for ODEs, efficient low-accuracy methods for ODEs, iterative methods and sparse techniques for implicit ODE methods, method of lines with variable space mesh, methods for parallel and/or network architectures, software and hardware tools, and other results. This report is administrative in nature, and is not meant to present detailed results. (ERA citation 05:031431)

HMI-264 PC **A08**/MF **A01**
Hahn-Meitner-Inst. fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.). Bereich Datenverarbeitung und Elektronik.
Scientific Annual Report, 1977.
1977, 160p
In German.
U.S. Sales Only.

In the section data processing and electronics, application-oriented R+D activities in the field of general and process-oriented data processing, digital and analogue measuring systems and electronic components are carried out in seven working groups and two project groups: HMI computer network; mathematical software and computer graphics; software development; nuclear electronics, measurement and control; research on components and irradiation tests; operation of the central computers; process data processing in medicine; cooperation with the Wissenschaftliches Rechenzentrum Berlin (WRB) in the project BERNET. (Atomindex citation 10:421704)

HMI-297 PC **A09**/MF **A01**
Hahn-Meitner-Inst. fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.). Bereich Datenverarbeitung und Elektronik.
Scientific Progress Report 1978.
1978, 176p
In German.
U.S. Sales Only.

Recent work of HMI in the following fields is reported: HMI interconnected computer operation numerical and graphical user software, process computer systems - software and hardware, measurement and control, process data processing in medicine, research on structural element radiation tests. (Atomindex citation 11:497552)

IFVE-OEA-77-105 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Autonomous Crate Controller.
V. V. Komarov, and N. N. Trofimov. 1977, 7p
In Russian.
U.S. Sales Only.

The paper presents a description of a controller, that allows one to control autonomously the modules in the crate in accordance with the microprograms, stored in the ROM. An essential advantage in this case is a small response time and high rate of generating the commands. When the autonomous controller operates "on-line" with the computer one can reduce the loading of I/O channels greatly and increase the efficiency of using the computer. (Atomindex citation 09:415047)

ITEF-39(1979) PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
PRET-Instrument for Recognition of Track Elements. Design Principles and Performance Logics.
V. E. Krupnov, and O. P. Fedotov. 1979, 30p
In Russian.
U.S. Sales Only.

Design principles and performance logics of an experimental specimen of the PRET instrument for track element recognition are considered. The instrument represents a specialized processor, jointly operating with the ES-1010 computer, it is designed for recognition of track elements during the primary processing of the information from measuring-recording systems with raster expansion of a flat picture from any track chamber. The main elements of the instrument are a block of information conversion, a block of local calculators, an array of recognition registers and equipment interface with the computer. The instrument specifications are the following: maximum digits per information word - 16, inner cycle of instrument - 1.5 mu s, maximum frequency of computer look-at - 300 kHz. The experimental PRET operation for processing 7000 images from 80 cm liquid-hydrogen chamber has shown, that the mean time of track recognition and data filtration from a projection, where the number of recorded points reaches 12-15 thousands, amounts on the average 15-20 s. (Atomindex citation 11:509253)

JAERI-M-7419 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Computer Programs for Interpolations. Development and Benchmark Test of SSL, (3).
T. Ise, and T. Tsutsui. Dec 77, 72p
In Japanese.
U.S. Sales Only.

Numerical evaluations have been performed on recent solution algorithms for interpolations through practical benchmark testings. Computer programs adopted for the present tests are those based on the Lagrange polynomial method, Aitken-Lagrange iterative method, the continued fraction iterative method, the spline method, and Akima's method, for uni-variate interpolations. In addition, programs using the spline method and Akima's method are tested for bi-variate interpolations. The results have shown that Akima's method is the best in every respect and hence it should take the place of the spline method used most often at present. In Appendix, input examples with job control cards are given for all tested programs and Anderson's program list rewritten in the standard FORTRAN for ter-variate interpolations. (Atomindex citation 09:412264)

JINR-R-11-11273 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods.
Adaptation of GRAFOR Graphical Subroutine Package on TEKTRONIX Terminals.
A. D. Rogov, and B. G. Shchinov. 1978, 22p
In Russian.
U.S. Sales Only.

Adaptation of GRAFOR graphical subroutine package, written in a high level language, on TEKTRONIX terminals switched to CDC-6500 computer is described. GRAFOR allows to display on a terminal screen two-dimensional representation of surfaces and space curves compared, as does the CDC graphic library LCGTVR2. For two-dimensional graphics objects, GRAFOR lets users acquire shorter programs than LCTVR2. Routines to produce graphic displays on the terminal screen and alternations in the GRAFOR subroutine package taking into account specific features of the CDC-6500 computer are described. (Atomindex citation 09:419352)

JINR-10-11447 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.

Organization and Storage of a Program Complex for Processing Film Information on the CDC-6500 Computer Discs.
N. A. Buzdavina, N. N. Govorun, V. S. Goman, A. Dimer, and V. G. Ivanov. 1978, 12p
In Russian.
U.S. Sales Only.

Organization and storage of a program complex for processing a film information on the CDC-6500 computer discs which provides their development and effective use at minimum memory resources on discs are described. This system provides the storage of program libraries and text information, the compactness of recording the latter, as well as high-speed of program-editors and the simplicity of modification of the versions available. (Atomindex citation 09:412260)

JINR-10-11452 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Library of Subroutines to Produce One- and Two-Dimensional Statistical Distributions on the ES-1010 Computer.
I. K. Vzorov, and V. V. Ivanov. 1978, 16p
In Russian.
U.S. Sales Only.

A library of subroutines to produce 1- and 2-dimensional distribution on the ES-1010 computer is described. 1-dimensional distribution is represented as the histogram, 2-dimensional one is represented as the table. The library provides such opportunities as booking and deleting, filling and clearing histograms (tables), arithmetic operations with them, and printing histograms (tables) on the computer printer with variable printer line. All subroutines are written in FORTRAN-4 language and can be called from the program written in FORTRAN or in ASSEMBLER. This library can be implemented on all computer systems that offer a FORTRAN-4 compiler. (Atomindex citation 09:415105)

JINR-10-11457 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
System for the Connection of the BESM-4 Computer with External Objects.
L. V. Tutyshkina. 1978, 10p
In Russian.
U.S. Sales Only.

A system for connection of the BESM-4 computer with external objects is described. The AELT-1 and AELT-2/160 scanning devices were created. The BESM-4 computer is modified and connected to a system used as a control computer. The external objects are: 1) a logical control system of the AELT-1; 2) a logical control system of the AELT-2/160; 3) symbol displays of VT-340 type; 4) the CDC-6500 computer on-line with the AELT-2/160. The connection system includes: a connection channel of MSK-1 type, selection-storage unit for external objects, an external objects commutator. The system connects up to 16 objects with the BESM-4 computer. (Atomindex citation 09:412079)

JINR-10-11498 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Crate Controller in the PUOS-CAMAC-the BESM-4 Computer Connection System.
V. N. Semenov. 1978, 10p
In Russian.
U.S. Sales Only.

The data exchange in an external dataway is performed along 4 buslines (towards the computer) and along 45 buslines (from the computer). The control information or particle track coordinates are transmitted in two CAMAC cycles. A CAMAC controller being a part of the PUOS-CAMAC semiautomatic device for chamber film processing on-line with the BESM-4 computer is described. (Atomindex citation 10:442096)

JINR-10-12319 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
8 Crate CAMAC System with the Dataway Extenders.
P. Khorvat, M. Morgach, and I. Turzo. 1979, 12p
CONF-7906164-1
In Russian.All-union conference on the automation of the scientific researches on the basis of computer application, Novosibirsk, USSR, Jun 1979.
U.S. Sales Only.

The CAMAC system with dataway extenders containing 8 crates is described. The main "zero" crate contains 7 dataway extenders and the interface driver. The dataways of 7 peripheral CAMAC crates are connected to the dataway "zero" crate through the dataway extenders. The interface driver was designed for the ND 812 Nuclear Data minicomputer. (Atomindex citation 11:497392)

JINR-10-12358 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Extension of Resources of the FORTRAN-4 Language for ES-1010 Computer.
S. V. Sergeev. 1979, 8p
In Russian.
U.S. Sales Only.

Subroutines are created which enable a program written in the FORTRAN-4 language to use more completely the resources of the ES-1010 operating system. LA, NEM, MOVE subroutines permit the call-program to use monitor tables, to create and use data arrays, positioned in an arbitrary point of memory, to operate with an absolute memory addressing, to realize the interaction of programs connected with different interruption levels of the ES-1010 system. DC10 subroutine executes the information exchange with any zone of the system magnetic disc. The ARIN subroutine permits floating point constants without format. The given subroutines facilitate using the high-level language (FORTRAN-4) in creating programs for receiving and primary processing of physical information for the ES-1010 computer. (Atomindex citation 11:509330)

JINR-11-10721 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Tape Recorder and Display Software for the Data Processing System on the "NAIRI-2" Computer.
E. K. Aksenova, V. V. Kol'ga, and N. I. Polumordvinova. 1977, 24p
In Russian.
U.S. Sales Only.

The software for the system of processing information obtained with basis computers, using the small computer "NAIRI-2" is described. The results of digital investigations are recorded with tape-recorders of basis computers (BESM-6, CSC-6500). The information obtained on tape is processed and presented in a preset form with the computer "NAIRI-2". The created system of programs makes it possible to select the prescribed dependence from the overall volume of information available on magnetic tape and to pass the point curve on the graphic display; it also furnishes all the service conditions having a magnetic tape. The new system of programs is operated using a language of autoprogramming and a number of new operators introduced into the translator of the computer "NAIRI-2". (Atomindex citation 10:421684)

JINR-11-10885 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Diagnostics Output Organization in the "Dubna" Operational System Dispatcher in Case of Errors in Computers Codes.
A. V. Gusev. 1977, 5p
In Russian.
U.S. Sales Only.

A new version of the print program for error diagnosis in the dispatcher of the "Dubna" operation system is described. The shortcomings of the old program, and the advantages of the new one are discussed. In the new version of the program, the volume of diagnostic information is extended which allows a list to be produced of the content of the arithmetic device conditions register, of the lower positions register, and of the adder. The listing of the registers' contents takes place at the moment of error diagnosis in the program, making it possible to determine the exact address of the place where the error occured. (Atomindex citation 10:421690)

JINR-11-11334 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Equipment Interface of Non-Standard Devices with the ES Computer.
N. V. Gorbunov, and B. A. Morozov. 1978, 14p
In Russian.
U.S. Sales Only.

An interface unit of non-standard devices with the ES computer is described. The unit provides simultaneous work of four non-standard devices. Data collection with word length up to 48 bits is available. The device adress could be switched over from a control board. The unit may work with either selector or multiplexor channels. (Atomindex citation 09:415045)

JINR-11-11400 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Equipment Interface of the ES-1010 and BESM-6 Computers.
V. E. Anikhovskii. 1978, 7p
In Russian.
U.S. Sales Only.

Problems of realization of the interface of coupling the ES-1010 and BESM-6 computers corresponding to requirements of communication official record for the commutator of external BESM-6 computers are considered. The aim of this work is creating of techniques for information exchange between the ES-1010 and BESM-6 computers. The block-scheme of interface, time diagrams of its operation, program characteristics and orders used are given. (Atomindex citation 09:412259)

JINR-11-11442 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
ES-1010 Computer as a Terminal Concentrator for the BESM-6 Computer. Interface for the ES-1010 and BESM-6 Computers. Data Transmission.
V. E. Anikhovski , S. A. Afanas'ev, A. A. Semenov, and S. A. Shchelev. 1978, 10p
In Russian.
U.S. Sales Only.

Some problems of the development and realization of a sharing system on the basis of the BESM-6 computer where the ES 1010 computer is used as a data concentrator are considered. Creating of hardware for the application of the BESM-6 computer in time sharing mode is described. The realization of an interface, specific features of using the pseudo-ternary code for data transmission are considered. A block-scheme of the sharing system based on the BESM-6 computer and orders used for programming the interface for the ES 1010 and BESM-6 computers are given. (Atomindex citation 09:412258)

JINR-13-12453 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Camac Specialized Processors for Event Selecuon by Solving Linear Inequalities.
S. G. Basiladze, A. N. Parfenov, and A. V. Pilyar. 1979, 7p
In Russian.
U.S. Sales Only.

A CAMAC specilized hardware processor is described intended to selecting events over an algorithm, being linear inequalities of sub(i=1) sigma sup(k)Asub(i)Xsub(i) > < Bsub(j) type. Xsub(i) input data enters the processor via a CAMAC dataway as 9-bit binary words. Asub(i) normalization coefficients and Bsub(j) comparison constants are stored in main memory processor, or could be transferred via a CAMAC dataway. One cycle of solving time takes (multiplying to a normalization coefficient, summation and comparison to a constant) about 1.2 mu s. (Atomindex citation 11:509248)

NCSR-R-17 PC **A03**/MF **A01**
National Centre of Systems Reliability, Culcheth (England).
Reliability and Protection Against Failure in Computer Systems.
B. K. Daniels. Jan 79, 26p
U.S. Sales Only.

Computers are being increasingly integrated into the control and safety systems of large and potentially hazardous industrial processes. This development introduces problems which are particular to computer systems and opens the way to new techniques of solving conventional reliability and availability problems. References to the developing fields of software reliability, human factors and software design are given, and these subjects are related, where possible, to the quantified assessment of reliability. Original material is presented in the areas of reliability growth and computer hardware failure data. The report draws on the experience of the National Centre of Systems Reliability in assessing the capability and reliability of computer systems both within the nuclear industry, and from the work carried out in other industries by the Systems Reliability Service. (Atomindex citation 11:497210)

N80-30053/6 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
Multihead and Multitape Real Time Turing Machines.
P. M. B. Vitanyi. Jun 79, 14p MC-IW-111/79
Submitted for Publication.

Previous results which show that a k-head tape unit can be simulated in real time by a 4k-4 tape Turing machine are reviewed. It is observed that 2 tape Turing machines are more powerful in real time than 1 tape Turing machines. Furthermore, more read-write heads are shown to yield additional power in real time. Specifically, it follows that a 4k-3 head tape unit is more powerful than a k-head tape unit in real time. It is shown that (k+1)-head tape units are mote powerful in real time than k-head tape units. Closure properties are investigated for classes of languages accepted by real time Turing machines with k one-head tape or one k-head tape.

N80-30061/9 PC **A02**/MF **A01**
Colorado Univ. at Boulder.
Flight Software Requirements and Design Support System.
Final Report.
W. E. Riddle, and B. Edwards. Aug 80, 18p
NASA-CR-163425
Grant NSG-1638

The desirability and feasibility of computer-augmented support for the pre-implementation activities occurring during the development of flight control software was investigated. The specific topics to be investigated were the capabilities to be included in a pre-implementation support system for flight control software system development, and the specification of a preliminary design for such a system. Further, the pre-implementation support system was to be characterized and specified under the constraints that it: (1) support both description and assessment of flight control software requirements definitions and design specification; (2) account for known software description and assessment techniques; (3) be compatible with existing and planned NASA flight control software development support system; and (4) does not impose, but may encourage, specific development technologies. An overview of the results is given.

N80-30062/7 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Dept. of Computer Science.
Functional Specifications of the Annular Suspension Pointing System, Appendix a.
B. Edwards. Jan 80, 22p NASA-CR-163419, CU-CS-171-80-APP-A
Grant NSG-1638

The Annular Suspension Pointing System is described. The Design Realization, Evaluation and Modelling (DREAM) system, and its design description technique, the DREAM Design Notation (DDN) is employed.

N80-30063/5 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Dept. of Computer Science.
Tools to Aid the Specification and Design of Flight Software, Appendix B.
G. Bristow. Jan 80, 11p NASA-CR-163420, CU-CS-168-80-APP-B
Grant NSG-1638

The tasks that are normally performed during the specification and architecture design stages of software development are identified. Ways that tools could perform, or aid the performance, of such tasks are also identified. Much of the verification and analysis that is suggested is currently rarely performed during these early stages, but it is believed that this analysis should be done as early as possible so as to detect errors as early as possible.

N80-30064/3 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Dept. of Computer Science.
Software Development Tools: A Bibliography, Appendix C..
W. E. Riddle. Jun 80, 13p NASA-CR-163421, CU-CS-183-80-APP-C
Grant NSG-1638

A bibliography containing approximately 200 citations on tools which help software developers perform some development task (such as text manipulation, testing, etc.), and which would not necessarily be found as part of a computing facility is given. The bibliography comes from a relatively random sampling of the literature and is not complete. But it is indicative of the nature and range of tools currently being prepared or currently available.

N80-30065/0 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Dept. of Computer Science.
Software Development Environments: Present and Future, Appendix D.
W. E. Riddle. 1980, 8p NASA-CR-163426, RSSM/96-APP-D
Grant NSG-1638
Repr. From the Proc. Intern. Computer Technol. Conf., Aug. 1980 8 p. Presented at the Intern. Computer Technol. Conf., San Francisco, Aug. 1980.

Computerized environments which facilitate the development of appropriately functioning software systems are discussed. Their current status is reviewed and several trends exhibited by their history are identified. A number of principles, some at (slight) variance with the historical trends, are suggested and it is argued that observance of these principles is critical to achieving truly effective and efficient software development support environments.

N80-30066/8 PC **A03**/MF **A01**
Colorado Univ. at Boulder.
An Assessment of Dream, Appendix E.
W. E. Riddle. 1980, 32p NASA-CR-163422, RSSM/100-APP-E
Grant NSG-1638
Repr. From Software Eng. Environ. (Amsterdam), 1980 32 p.

The design realization, evaluation and modelling (DREAM) system is evaluated. A short history of the DREAM research project is given as well as the significant characteristics of DREAM as a development environment. The design notation which is the basis for the DREAM system is reviewed, and the development tools envisioned as part of DREAM are discussed. Insights into development environments and their production are presented and used to make suggestions for future work in the area of development environments.

N80-30067/6 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Dept. of Computer Science.
Software Development Environment, Appendix F.
W. E. Riddle. Oct 80, 12p NASA-CR-163423, CU-CS-182-80-APP-F
Grant NSG-1638
Presented at the Compsac 80 Panel, Chicago, Oct. 1980.

The current status in the area of software development environments is assessed. The purposes of environments, the types of environments, the constituents of an environment, the issue of environment integration, and the problems which must be solved in preparing an environment are discussed. Some general maxims to guide near-term future work are proposed.

N80-30068/4 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Dept. of Computer Science.
Software Development Environments: A Bibliography, Appendix G.
W. E. Riddle. Jun 80, 10p NASA-CR-163424, CU-CS-184-80-APP-G
Grant NSG-1638

A bibliography containing approximately 100 citations on software development environments is given. The bibliography comes from a relatively random sampling of the literature and is not complete.

N80-30078/3 PC **A04**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
Goto Statements: Sematics and Deduction Systems.
A. Debruin. Jun 79, 55p MC-IW-74/79
Submitted for Publication.

A simple language containing goto statements is presented together with denotational and operational semantics for it. Equivalence of these semantical descriptions is proven. Furthermore, soundness and completeness of a Hoare-like proof system for the language is shown via two steps. First, a proof system is given and validity is defined using a variant of direct semantics. In this case soundness and completeness proofs are relatively easy. After that, a proof system is given which is more in the style of program proving using jumps and functions. Validity in this system is defined through continuation semantics. This validity definition is then related to validity in the first system, and using this correspondence, soundness and completeness for the second system is proven.

N80-30080/9 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
Space-Bounded Complexity Classes and Iterated Deterministic Substitution.
P. R. J. Asveld. Apr 79, 24p MC-IW-108/79
Submitted for Publication.

The effect on space complexity is investigated for a language family K extended by means of iterated lambda free deterministic substitution to the family eta (K). If each language in K is accepted by a one way nondeterministic mulitape Turing machine within space S(n) or = log N, then eta (K) is included in NSPACE(S(n)). Thus, for each monotonic space bound S(n) or = N, the inclusion K as a subclass within NSPACE (S(n)) implies that eta (K) is also included in NSPACE(S(n)). An implication similar to the latter one also holds for DSPACE(S(n)). Consequently, some well-known space-bounded complexity classes such as the families of nondeterministic context sensitive languages, of two nondeterministic nonerasing stack automation languages, and PSPACE are abstract family of languages closed under intersection and iterated lambda free deterministic substitution. On the other hand, no space-bounded complexity class which includes DSPACE(log n) is closed under controlled iterated lambda free nondeterministic substitution.

N80-30081/7 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
On Controlled Iterated Gsm Mappings and Related Operations.
P. R. J. Asveld. Aug 79, 14p MC-IW-114/79
Submitted for Publication Sponsored by Netherlands Organization for Advancement of Pure Science.

Families of languages generated iterated generalized sequential machine (GSM) mappings, iterated finite substitutions, and iterated homomorphisms are considered. The relation between iterated finite substitutions (homomorphisms) and (deterministic) tabled context independent Lindenmayer systems is discussed.

N80-30082/5 PC **A03**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
Correctness Theories and Program Equivalence.
J. A. Bergstra, J. Tiuryn, and J. V. Tucker. Sep 79, 37p MC-IW-119/79
Submitted for Publication Sponsored by Netherlands Organization for Advancement of Pure Science.

The mathematical concept that a programming language semantics can be sensibly determined by proof rules for the before-after assertions required true of programs in the language was investigated. It is shown that the theory of program correctness based on first order logic can in a natural way specify the basic semantical concept of program equivalence in the case of programs terminating throughout any given class of data structures, but that diverging programs require rather delicate investigations into the associated classes.

N80-30083/3 PC **A05**/MF **A01**
Forschungsinstitut fuer Funk und Mathematik, Werthoven (Germany, F.R.).
Modular Programming for Multicomputer Systems.
W. Gruenewald. Mar 79, 81p FFM-277
Text in German; English Summary.

A task-oriented modular programming scheme was tried out on a multi-minicomputer system. As a test problem, a simulation system involving 30 tasks was microprogrammed, the simulation being handled by microprocessors. Results show the value of a task oriented approach to sequential programming and processing in terms of software resource management by the operating system. Problems in parallel processing do not arise. Multiple machine intercommunication is considered. However, further analysis of communication language structure is still needed to optimize system efficiency.

N80-30084/1 PC **A05**/MF **A01**
Forschungsinstitut fuer Funk und Mathematik, Werthoven (Germany, F.R.).
Digital Image Restoration.
K. Vonderheide. Aug 79, 82p FFM-286
Text in German; English Summary.

A deterministic parametric approach to digital image reconstruction and enhancement, which avoids the use of Fourier transformations, was investigated. The image restoration problem is handled on the basis of the method of least squares. Both object intensity and the point spread function were modeled as stochastic processes. A simple positivity constraint was introduced and a dynamic data smoothing algorithm was used. Some test measurements from numerical simulations were reconstructed as one dimensional images after implementing the method in an ALGOL program. The program was only intended to show the validity of this method and was not optimized for run time.

N80-30092/4 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Applied Mathematics.
Non-Uniqueness in Singular Optimal Control.
J. Grasman. Mar 79, 8p MC-TW-188/79
Submitted for Publication.

Singular optimal control problems of linear, time invariant n-dimensional dynamic systems, having performance index represented by a symmetric positive semidefinite matrix, are investigated. A finite dimensional linear state space is denoted and the system is assumed controllable. The control vector u has its values in a linear m-dimensional space and u(t) is assumed to be continuous for t zero. It is shown that there exists a class of linear singular optimal control problems with a non-unique singular arc. The problems in this class have a controllability subspace in which the trajectories may vary without affecting the performance index.

N80-30095/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
A Computer Program for Determining Truncation Error Coefficients for Runge-Kutta Methods.
M. K. Horn. Jul 80, 27p NASA-TM-81143, JSC-16429

The basic structure of a program to generate the truncation error coefficients for Runge-Kutta (RK) methods is reformulated to reduce storage requirements significantly and to accommodate variable dimensioning. This FORTRAN program, SUBROUTINE RKEQ, determines truncation error coefficients for RK algorithms for orders 1 through 10 and extends the order of coefficients through 12 with the 11th- and 12th-order terms determined following the patterns used to establish the lower order coefficients. Both subroutines (the original and RKEQ) are also written to treat RK m-fold methods which utilize m known derivatives of f to increase the order of the algorithm. Setting m = 0 gives the classical RK algorithm.

PB80-224926 PC **A06**/MF **A01**
Measurement Concept Corp., Rome, NY.
Assessment of Computer Mass Storage Technology.
Final rept.
Jan 80, 125p NBS-GCR-80-278
Contract E0-A01-7800-3630

The objective of this study is to assess the state-of-the-art of computer mass storage devices and technology, giving particular emphasis to computer system architecture implications. Provided in this report is an overview of the technologies that presently are and, in the near future and intermediate future, can be applied in the construction of mass storage systems. Discussed are implementation considerations of mass storage systems ranging from the most primitive interface techniques to sophisticated back-end data base processor approaches. The concept of data base machines is introduced particularly in the way they impact on architectural requirements of mass storage systems. Finally the consequences of the eventual use of mass storage systems in distributed and network processing systems are discussed.

PB80-227911 PC **E03**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
Digital Equipment Corporation, PDP-11 COBOL V4.1.
Validation summary rept.
15 Sep 80, 41p CCVS74-VSR620

This Validation Summary Report (VSR) for the PDP-11 COBOL Compiler Version 4.1 (RSTS/E Version 7.0) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB80-814783 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Minicomputers. July, 1975-1978 (Citations from the NTIS Data Base).
Rept. for Jul 75-1978,
Brian Carrigan. Sep 80, 257p
See also 1964-June, 1975, NTIS/PS-76/0672.

The bibliography cites reports on the design and applications of minicomputers. A few of the areas of application include audio recorders, chemical analysis, radiation detection, process control, reactor control, production control, ocean sciences, and tracking systems. Citations include supporting software for solving the problems and processing the data in the many areas of application. (This updated bibliography contains 252 citations, none of which are new entries to the previous edition.)

PB80-814890 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Magnetic Bubble Domains. 1964-August, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Aug 80,
George W. Reimherr. Aug 80, 135p
Supersedes NTIS/PS-79/0967, and NTIS/PS-78/0950.

The cited reports from Federally-funded research discuss material properties, crystal growth, domain structure and motion, nuclear radiation effects, and applications such as magnetic memory devices. (This updated bibliography contains 130 citations, 14 of which are new entries to the previous edition.)

PB80-850332 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Read-Only-Memories. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jul 80, 69p
NERACIAANT0267
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe Read Only Memories (ROMs), Programmable ROMs as well as Erasable Programmable ROMs. The functional compatability of these devices, and how their particular design relates to system design is also included. (Contains 061 citations.)

PB80-850340 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Read-Only-Memories. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jul 80, 68p NERACEI NT0267
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe Read Only Memories (ROMs), Programmable ROMs as well as Erasable Programmable ROMs. The functional compatability of these devices, and how their particular design relates to system design is also included. (Contains 077 citations.)

PB80-851934 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computer and Video Games. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 60p NERACIAANT1103
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning computerized simulation, game theory, and computer-directed systems. Citations include descriptions of operations research, systems analysis, decision making, state estimation, and optimization methods. (Contains 050 citations.)

PB80-851942 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computer and Video Games. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 76p NERACEI NT1103
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning computerized simulation, game theory, and computer-directed systems. Citations include descriptions of operations research, systems analysis, decision making, state estimation, and optimization methods. (Contains 070 citations.)

PB80-853211 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
PASCAL Programming Language. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,

Howard L. Ogushwitz. Jun 80, 67p
NERACUSGNT0227
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography evaluate, describe, and show current applications of the PASCAL programming language. (Contains 085 citations.)

PB80-853229 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
PASCAL Programming Language. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 126p NERACEI NT0227
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography evaluate, describe, and show current applications of the PASCAL programming language. (Contains 137 citations.)

PB80-853609 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Miniature Calculators. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 79p NERACEI NT0620
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, development and applications of miniature and hand-held calculators. Among the applications discussed are novel applications of programmable hand-held calculators, solving welding design problems with pocket calculators, and pocket calculators interfaced with aircraft. (Contains 065 citations.)

PB80-854425 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Cores. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 29p NERACUSGNT0798
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the composition, characteristics, and application of various types of magnetic core storage or magnetic core memory storage devices are contained in this retrospective bibliography. (Contains 150 citations.)

PB80-854466 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Storage. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 83p NERACUSGNT0816
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on properties and applications of magnetic storage materials, devices and systems are contained in this retrospective bibliography. (Contains 065 citations.)

PB80-854474 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Storage. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 51p NERACEDBNT0816
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on properties and applications of magnetic storage materials, devices and systems are contained in this retrospective bibliography. (Contains 030 citations.)

PB80-854482 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Storage. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
John H. Frey. Jun 80, 167p NERACIAANT0816
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on properties and applications of magnetic storage materials, devices and systems are contained in this retrospective bibliography. (Contains 130 citations.)

PB80-856107 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Optical Memory Data Storage. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 58p NERACEI NT0975
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the technology, design, and capacity of optical memory systems. Citations include descriptions of optical data recording techniques such as disc memories, holographic memories, pattern recognition systems, image memories, and the use of optical filters, electrooptic materials, and ferroelectric crystals. (Contains 072 citations.)

PB80-856743 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computer Architecture. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Aug 80, 116p
NERACIAANT0259
Sponsored in part by National Technical Information Service, Springfield, VA.

The articles and research studies cited in this bibliography contain a discussion of the latest advances in the field of computer architecture. Articles contained cover the design of a large variety of computer systems, microcomputer components, and digital networks. (Contains 102 citations.)

PB80-856750 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computer Architecture. April, 1978-June, 1980 (Citations from the NTIS Data Base).
Rept. for Apr 78-Jun 80,
Howard L. Ogushwitz. Aug 80, 207p
NERACUSGNT0259
Sponsored in part by National Technical Information Service, Springfield, VA.

The articles and research studies cited in this bibliography contain a discussion of the latest advances in the field of computer architecture. Articles contained cover the design of a large variety of computer systems, microcomputer components, and digital networks. (Contains 200 citations.)

PB80-856768 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computer Architecture. September, 1978-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Sep 78-Jun 80,
Howard L. Ogushwitz. Aug 80, 181p NERACEI NT0259
Sponsored in part by National Technical Information Service, Springfield, VA.

The articles and research studies cited in this bibliography contain a discussion of the latest advances in the field of computer architecture. Articles contained cover the design of a large variety of computer systems, microcomputer components, and digital networks. (Contains 200 citations.)

PB80-856826 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Minicomputers. October, 1977-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Oct 77-Jun 80,
William V. Sassi. Aug 80, 196p NERACEI NT0352
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, development, and application of minicomputers to various fields such as signal processing, radiation spectro-analysis, the nuclear power industry, and the steel industry. Also included is a discussion of minicomputer software. (Contains 200 citations.)

PB80-856834 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Minicomputers. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Aug 80, 129p
NERACEDBNT0352
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, development, and application of minicomputers to various fields such as signal processing, radiation spectro-analysis, the nuclear power industry, and the steel industry. Also included is a discussion of minicomputer software. (Contains 124 citations.)

PB80-856859 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Microprocessors. October, 1978-May, 1980 (Citations from the Energy Data Base).
Rept. for Oct 78-May 80,
William V. Sassi. Jun 80, 188p
NERACEDBNT0363
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, test, development, and application of microprocessors to various fields such as: medicine, communications, nuclear physics, and military electronic systems. Also included is a discussion of microprocessor programming. (Contains 200 citations.)

PB80-856867 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Microprocessors. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 144p
NERACIAANT0363
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, test, development, and application of microprocessors to various fields such as: medicine, communications, nuclear physics, and military electronic systems. Also included is a discussion of microprocessor programming. (Contains 111 citations.)

PB80-856883 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Minicomputers. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 124p
NERACIAANT0352
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, development, and application of minicomputers to various fields such as signal processing, radiation spectro-analysis, the nuclear power industry and the steel industry. Also icluded is a discussion of minicomputer software. (Contains 114 citations.)

PB80-857790 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Interactive Display Devices. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 122p
NERACUSGNT0605
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the design and application of interactive display devices in various computer environments. (Contains 060 citations.)

PB80-857808 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Interactive Display Devices. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 138p
NERACEDBNT0605
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the design and application of interactive display devices in various computer environments. (Contains 097 citations.)

PB80-859341 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Structural Mechanics Software: NASTRAN. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Report period covered: Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 189p
NERACUSGNT0229
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe topics related to NASTRAN (NASA Structural Analysis). Topics include the application of NASTRAN to the space shuttle, motor component vibrations, Lockheed missiles, etc. (Contains 178 citations.)

PB80-860158 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Computer and Video Games. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 140p
NERACUSGNT1103
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning computerized simulation, game theory, and computer-directed systems. Citations include descriptions of operations research, systems analysis, decision making, state estimation, and optimization methods. (Contains 113 citations.)

SAND-80-0538/3 PC A03/MF A01
Sandia National Labs., Albuquerque, NM.
Remote Hard Copy. Volume 3. Systems Programming Manual.
R. W. Simons. Mar 80, 36p
Contract AC04-76DP00789

The software used to operate and maintain the remote hard copy is described. All operating software that runs in the NOVA minicomputers is covered as are various utility and diagnostic programs used for creating and checking this software. 2 figures. (ERA citation 05:031436)

SAND-80-1171 PC A04/MF A01
Sandia National Labs., Albuquerque, NM.
RATFOR: User's Guide.
B. E. Wampler. Jun 80, 67p
Contract AC04-76DP00789

RATFOR is a preprocessor for Fortran that allows the programmer to use structured control statements and free form input. This manual describes a version of RATFOR developed at Sandia National Laboratories that has a number of enhancements over the original version developed at Bell Laboratories. (ERA citation 05:031439)

UCRL-84566 PC A02/MF A01
Lawrence Livermore National Lab., CA.
Archival Memory System (AMS) Specification.
G. A. Michael. 1980, 12p CONF-800387-1
Contract W-7405-ENG-48
IEEE workshop on mass storage, Denver, CO, USA, 16 Mar 1980.

The technical specification for an archival memory system is described. A phased acquisition leading ultimately to a very large (> 10 exp 15 bits) on-line memory facility is envisioned. 8 figures. (ERA citation 05:031440)

9C. Electrical and Electronic Engineering

AD-A088 121/9 PC A05/MF A01
Polytechnic Inst of New York Brooklyn Microwave Research Inst
Basic Research in Electronics (JSEP).
Final rept. 1 Apr 78-31 Mar 80,
Arthur A. Oliner. Jun 80, 87p POLY-MRI-1404-80, AFOSR-TR-80-0620
Contract F49620-78-C-0074

Contents: ELECTROMAGNETICS: Millimeter Wave Waveguides and Antenna Arrays; Hybrid Ray-Mode Formulation of Ducted Propagation; Wave-Matter Interactions, Optical Waveguiding Structures; Solid State Electronics: X-ray Guided Wave Electronics; Interaction of Millimeter Waves and Semiconductors; Acoustoelectric and Acoustooptic Devices, Electric and Magnetic Interactions in Thin Films and Surface Regions of Solids; New Solid State Materials, Electronic Properties of Hydrogen in Solids; Information Electronics: Reduced Order Models of Large Scale Systems; Enhancement, Extraction and Reconstruction Techniques; Robust Procedures in Estimation and Detection Problems.

AD-A088 221/7 PC A99/MF A01
Army Electronics Command Fort Monmouth NJ
Proceedings of the Annual Frequency Control Symposium (31st) Held at Atlantic City, New Jersey on 1-3 June 1977.
1977, 633p
See als0 AD-A046 089 and AD-746 210.

Reports are listed under the following subheadings: Force and Temperature Sensitivity of Quartz Crystal Resonators; Quartz Crystal Resonators Design, Measurement and Application; Resonator Processing; Fundamental Properties of Materials; Filters; Surface Acoustic Wave Resonators and Filters; Oscillator Specification and Measurement; Oscillators; Frequency and the Control Aspects of Digital Communication; Time Distribution and Synchronization; Atomic and Molecular Frequency Standards; Far Infrared/Submillimeter Wave Devices for Frequency Standards - Novel Resonators.

AD-A088 422/1 PC A11/MF A01
Purdue Univ Lafayette IN
PRANC: Program for Analyzing Nonlinear Circuits.
Phase rept. Nov 78-Nov 79,
H. K. Thapar, and B. J. Leon. May 80, 241p
RADC-TR-80-139
Contract F30602-78-C-0102

The application of the Volterra series method for the analysis of circuits with multiple nonlinear elements and multiple multi-frequency input sources is described. Using multi-dimensional transform theory, an approach for deriving the Volterra transfer functions is given. The computation of the sinusoidal steady-state response from these transfer functions is presented. Finally, algorithms for adapting the Volterra series method for computer-aided steady-state analysis of nonlinear circuits are described. A complete documentation of the program PRANC, which uses the Volterra series approach, is also contained in this report. (Author)

DOE/ET/29299-T1 PC A03/MF A01
General Electric Co., Schenectady, NY.
Stochastic Power Flow Modeling.
Jun 80, 45p
Contract AC01-78ET29299

The stochastic nature of customer demand and equipment failure on large interconnected electric power networks has produced a keen interest in the accurate modeling and analysis of the effects of probabilistic behavior on steady state power system operation. The principle avenue of approach has been to obtain a solution to the steady state network flow equations which adhere both to Kirchhoff's Laws and probabilistic laws, using either combinatorial or functional approximation techniques. Clearly the need of the present is to develop sound techniques for producing meaningful data to serve as input. This research has addressed this end and serves to bridge the gap between electric demand modeling, equipment failure analysis, etc., and the area of algorithm development. Therefore, the scope of this work lies squarely on developing an efficient means of producing sensible input information in the form of probability distributions for the many types of solution algorithms that have been developed. Two major areas of development are described in detail: a decomposition of stochastic processes which gives hope of stationarity, ergodicity, and perhaps even normality; and a powerful surrogate probability approach using proportions of time which allows the calculation of joint events from one dimensional probability spaces. (ERA citation 05:030608)

PB80-850274 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Electric Flashover. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jul 80, 51p
NERACIAANT0260
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles include a discussion of electric arcing in air as well as other gases. Abstracts include topics such as electric flashover and discharges or sparks between conductors, arc tracking and other discharge faults occurring in dielectrics. (Contains 068 citations.)

PB80-850282 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Electric Flashover. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jul 80, 128p NERACEI NT0260
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles include a discussion of electric arcing in air as well as other gases. Abstracts include topics such as electric flashover and discharges or sparks between conductors, arc tracking and other discharge faults occurring in dielectrics. (Contains 128 citations.)

PB80-850514 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Brushless Motors. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 58p NERACEI NT0314
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles discuss the performance analysis, operation, and design of electric motors commutated electronically. (Contains 57 citations.)

PB80-850563 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Stepper Motors. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 140p NERACEI NT0275
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe performance, applications, control, and construction of variable reluctance stepper motors. (Contains 141 citations.)

PB80-850605 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electric Power Switching. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 49p
NERACIAANT0262
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles cover topics on switch mode regulators or switched voltage regulators. Discussions also include DC to DC convertors, UHV DC systems, and switched power supplies. (Contains 043 citations.)

PB80-850613 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electric Power Switching. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 86p
NERACUSGNT0262
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles cover topics on switch mode regulators or switched voltage regulators. Discussions also include DC to DC convertors, UHV DC systems, and switched power supplies. (Contains 079 citations.)

PB80-850639 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electric Power Switching. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 102p NERACEI NT0262
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles cover topics on switch mode regulators or switched voltage regulators. Discussions also include DC to DC convertors, UHV DC systems, and switched power supplies. (Contains 113 citations.)

PB80-852916 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electric Flashover. January, 1974-May, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Aug 80, 46p
NERACUSGNT0260
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss electric arcing in air as well as other gases. Abstracts include topics such as electric flashover and discharges or sparks between conductors, arc tracking and other discharge faults occurring in dielectrics. (Contains 033 citations.)

PB80-852924 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electric Flashover. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Aug 80, 56p
NERACEDBNT0260
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss electric arcing in air as well as other gases. Abstracts include topics such as electric flashover and discharges or sparks between conductors, arc tracking and other discharge faults occurring in dielectrics. (Contains 047 citations.)

PB80-853005 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Brushless Motors. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 26p
NERACUSGNT0314
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the performance, operation, and design of electric motors commutated electronically. (Contains 019 citations.)

PB80-853427 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Encapsulation of Electronic Equipment. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Aug 80, 44p
NERACEDBNT0390
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which deal with encapsulation of electronic equipment, especially solar cells and arrays. Properties and evaluations of several encapsulants are also discussed. (Contains 029 citations.)

PB80-853732 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Encapsulation of Electronic Equipment. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Lawrence H. Marcus. Jun 80, 69p
NERACIAANT0390
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports discussing the encapsulation of electronic equipment, including integrated circuits, semiconductors and microelectronics. Reliabilities and failure modes of the encapsulant and the encapsulated equipment are also presented. (Contains 058 citations.)

PB80-853930 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electronic Equipment Manufacturing. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 183p NERACEI NT0631
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the industrial, economic and engineering aspects of electronic equipment manufacturing. Among the types of equipment discussed is electronic test and measuring instruments, plastic encapsulation for microelectronic devices and automotive electronics. (Contains 200 citations.)

PB80-856040 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Microelectronic Production. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 166p
NERACUSGNT0947
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the design, manufacturing, processing and testing of microelectronic devices. Citations include descriptions of hybrid microcircuits, thin film microstructure technology, timing and trigger circuits, microelectronic test structures and molecular engineering as applied to computer systems, electronic devices, biology, medicine, materials research, chemistry and physics. (Contains 150 citations.)

PB80-856057 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Microelectronic Production. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 42p NERACEI NT0947
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the design, manufacturing, processing and testing of microelectronic devices. Citations include descriptions of hybrid microcircuits, thin film microstructure technology, timing and trigger circuits, microelectronic test structures and molecular engineering as applied to computer systems, electronic devices, biology, medicine, materials research, chemistry and physics. (Contains 060 citations.)

PB80-856149 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Microelectronic Production. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 163p
NERACIAANT0947
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations presented in this bibliography cover the advantages of amorphous semiconductors over crystalline semiconductors as applied to electronic technology and manufacturing. Problems pertaining to solid-state physics, design and technology of integrated elements and circuits based on thin and thick films are also discussed. (Contains 166 citations.)

PCTR-47-77 PC **A16**/MF **A01**
Purdue Univ., Lafayette, IN. School of Electrical Engineering.
Generalized Stochastic Power Flow Algorithm.
P. W. Sauer. Aug 77, 359p TR-EE-77-32
Contract AS02-77ET29102

A general algorithm to determine the effects of uncertainty in bus load and generation on the output of conventional power flow analysis is presented. The use of statistical moments is presented and developed as a means for representing the stochastic process. Under this concept, statistical moments are used to describe the uncertainties and facilitate the calculations of single and multivariate probability density functions of input and output variables. Standard distributions need not be used, although the method is applicable for most distributions which have finite moments. The transformation of the uncertainty through the power flow equations is made by the expansion of the node equations in a multivariate Taylor series about an expected operating point. The series is truncated after the second order terms. Since the power flow equations are nonlinear, the expected values of output quantities are in general not the solution to the conventional load flow problem using expected values of input quantities. The second order transformation offers a correction vector and allows the consideration of larger uncertainties which have caused significant error in the current linear transformation algorithms. Voltage controlled busses are included with consideration of upper and lower limits. The finite reactive power available at generation sites and fixed ranges of transformer tap movement may have a significant effect on voltage and line power flow statistics. A method is given which considers limitation constraints in the evaluation of all output quantities. The bus voltages, line power flows, transformer taps, and generator reactive power requirements are described by their statistical moments. Their values are expressed in terms of the probability that they are above or below specified limits, and their expected values given that they do fall outside the limits. (ERA citation 05:030610)

SCI-5263(V.1) PC **A07**/MF **A01**
Systems Control, Inc., Palo Alto, CA.
Development of Advanced Methods for Planning Electric Energy Distribution Systems. Final Report.
D. W. Ross, M. Carson, A. I. Cohen, C. Dechamps, and R. Nuytten. Feb 80, 144p
Contract ET-78-C-03-1845

The research project, Development of Advanced Methods for Planning Electric Energy Distribution Systems is summarized. The research has con-

cerned the development of new approaches to the planning of radial primary distribution systems. In particular, the research has addressed two problem areas: the development of optimization models for arranging or rearranging the radial structure of a system of feeders - for planning the normal operating configuration of the system; and the development of optimization models for reconfiguration (made possible by manual or automatic switching) of a radial system of feeders during either emergencies or planned outages. Details of the method of approach and of the models' development and testing are included in this volume. A separate Volume II provides computer program listings and supporting documentation. (ERA citation 05:030611)

SCI-5263(V.2) PC **A17**/MF **A01**
Systems Control, Inc., Palo Alto, CA.
Development of Advanced Methods for Planning Electric Energy Distribution Systems. Volume 2. Software Documentation. Final Report.
D. W. Ross, M. Carson, and R. Nuytten. Dec 79, 388p
Contract ET-78-C-03-1845

This report supplements the Final Report, Development of Advanced Methods for Planning Electric Energy Distribution Systems, and documents the DISOPT-1 and SWITCH-1 software which resulted from the development work. Information is included on: some of the terminology used in the software development; the input data cards required for DISOPT-1 and SWITCH-1; the COMMON block structure for data within the two programs; the run control cards and the solution parameter cards for the two programs; sample DISOPT outputs; sample SWITCH outputs; and, finally, the FORTRAN listings of the programs. (ERA citation 05:030612)

UCID-18728 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Engineering Research Division Report on Reports: Calendar Year 1979.
C. L. Gardner, and S. J. Johnston. Mar 80, 79p
Contract W-7405-ENG-48

A bibliography of publications of members of the Engineering Research Division of the Electronics Engineering Department is presented for 1979. Abstracts for 148 publications are included, along with author and keywork indexes. (ERA citation 05:031077)

9D. Information Theory

PB80-850829 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Error Detection Codes. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 70p
NERACIAANT0258
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles include a discussion of error detecting codes for use in computer software. A description of specific hardware designed and developed for physical implementation of polynomial check code generation and detection is also given. (Contains 162 citations.)

PB80-850837 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Error Detection Codes. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 142p
NERACUSGNT0258
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles include a discussion of error detecting codes for use in computer software. A description of specific hardware designed and developed for physical implementation of polynomial check code generation and detection is also given. (Contains 137 citations.)

PB80-850845 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Error Detection Codes. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 50p NERACEI NT0258
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles include a discussion of error detecting codes for use in computer software. A description of specific hardware designed and developed for physical implementation of polynomial check code generation and detection is also given. (Contains 047 citations.)

9E. Subsystems

AD-A087 878/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Commutator,
P. N. Dashuk. 11 Dec 79, 8p Rept no. FTD-ID(RS)T-1851-79
Edited trans. of Patent (USSR) 319 973 p1-2, 2 Sep 71, by Victor Mesenzeff.

No abstract available.

AD-A088 088/0 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Building Block for an Orthonormal-Lattice-Filter Adaptive Network.
Interim rept.,
W. F. Gabriel. 10 Jul 80, 42p Rept no. NRL-8409

The recent algorithm for a multistage multichannel orthonormal lattice filter proposed by M. Aftab Alam is a welcome addition to the library of adaptive-processing algorithms and provides a flexible alternative to the conventional approach of an optimum Weiner filter. His algorithm is based on a Gram-Schmidt orthonormalization procedure which is similar to cascade adaptive processing techniques described in earlier works. One of the most desirable features of this type of processing network is that it can be implemented with simple one-stage orthogonal-filter building blocks which directly filter the input data samples. These building blocks are the major subject of this report, and a particular configuration is developed based on a modified version of the familiar Howells-Applebaum algorithm. It can be implemented in either analog or digital form, data storage is not required, it is unconditionally stable, speed of convergence is no longer a problem, and the design is simple. The performance characteristics of a complete orthogonal-lattice-filter network operating in the spacial domain were simulated for example cases of one, two, and three strong incoherent signal sources spaced within a beamwidth for a eight-element linear-array antenna. The adapive spacial filter patterns and the transient responses demonstrate that the building block has sufficient transient-response speed and control to permit full use of the processing capabilities inherent in a Gram-Schmidt cascade network.

AD-A088 165/6 PC **A05**/MF **A01**
Army Military Personnel Center Alexandria VA
Application of Image Intensifier Technology to the Military, Scientific, Industrial, Educational, and Medical Communities.
Final rept.,
Patrick H. Orell. 30 May 80, 99p
Master's thesis.

This research paper addresses the applications of Image Intensifier technology to the Military, Scientific, Industrial, Educational and Medical communities. Image intensifiers are components, that when incorporated into scopes, photographic cameras, television cameras and weapons delivery systems, allow the operator visibility into dark or low illumination areas. The technology has surfaced within the last twenty years and has been, until recently, confined to the military for applications. Image intensified devices are rapidly becoming more popular for various applications, yet many persons are not aware of their existence or potential. The paper is written in non-technical terms to describe the physical make--up of first and second generation Image Intensifiers and addresses the newly developed charged coupled devices and third generation intensifiers under development. It covers a representative sample of applications that have been documented to date by the various manufacturers of Image Intensifiers and the laboratories and agencies that evaluate them. The paper incorporates 37 photographs and illustrations of devices and their applications in support of the communities listed. A list of documented applications and an Image Intensifier tube sensitivity chart is provided for information and reference. (Author)

AD-A088 179/7 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign Electromagnetics Lab
Radiation from an Open-Ended Waveguide with Beam Equalizer. A Spectral Domain Analysis.
Technical rept.,
W. L. Ko, R. Mittra, and S. W. Lee. Jul 80, 38p
Rept nos. UIEM-80-6, UILU-ENG-80-2547
Contract N00014-75-C-0293

A septum and an impedance matching post are used as a beam equalizer in an open-ended waveguide-feed for reflectors used in satellite communications systems. The performance of this design over a frequency band is evaluated usign a spectral domain approach. The computed radiation patterns in the E- and H-planes, as well as the results for the impedance match, are presented. (Author)

AD-A088 237/3 PC **A03**/MF **A01**
Rockwell International Thousand Oaks CA Electronics Research Center
High-Contrast Electroluminescent Readout Device.
Interim technical rept. 2 Oct 78-31 Jan 79,
M. K. Kilcoyne. Aug 80, 35p ERC41016.9IRF, DELET-TR-78-2996-1
Contract DAAB07-78-C-2996

The Rockwell Science Center has completed the first phase of the development program encompassing the design, fabrication, and characterization of experimental models of a high-contrast numeric electroluminescent readout device. This device consists of two-digits of seven-segment numeric displays using a transparent electroluminescent thin film with a high-contrast background layer. The device also contains within its hermetically-sealed package, logic and drive circuitry to operate the numeric displays from a typical computer output data processing information, with typical 5-volt T sq L logic level and BCD input. (Author)

AD-A088 238/1 PC **A03**/MF **A01**
Rockwell International Thousand Oaks CA Electronics Research Center
High Contrast Electroluminescent Numeric Readout Device.
Interim technical rept. 1 Feb-31 May 79,
M. K. Kilcoyne. Aug 80, 35p ERC41016.15IRF, DELET-TR-78-2996-2
Contract DAAB07-78-C-2996

The Rockwell International Electronics Research Center has completed the second phase of the development program encompassing the design, fabrication, and characterization of experimental models of a high-contrast numeric electroluminescent readout device. This device consists of two-digits of seven-segment numeric displays using a transparent electroluminescent thin film with high-contrast background layer. The device also contains within its hermetically sealed package, logic and drive circuitry to operate the numeric displays from a typical computer output data processing information, with five volt T sq L logic level and BCD input. (Author)

AD-A088 273/8 PC **A02**/MF **A01**
Naval Research Lab Washington DC

Computations of the Radiation Pattern of a Reflector Antenna.
Memorandum rept.,
J. K. Hsiao. 26 Aug 80, 19p Rept no. NRL-MR-4325

This report describes a mathematical approach to compute the radiation pattern of a reflector antenna. The radiation integral is expanded into an orthogonal series in terms of a field point coordinate. Since this series is orthogonal, coefficients of this series can be easily determined. Once these coefficients are known, radiation patterns at any field point can be readily computed. Since this approach avoids performing the integration of the radiation integral at each field point, it greatly reduces the required computation. A brief description of the computer program is also included in this report. (Author)

AD-A088 276/1 PC **A03**/MF **A01**
Weapons Systems Research Lab Adelaide (Australia)
An Iterative Approach to the Deconvolution of the Narrowband Outputs of a Conventional Beamformer.
Technical rept.,
D. A. Gray. Feb 80, 31p Rept no. WSRL-0141-TR

In conventional beamforming the estimated noise power wave number spectrum is the convolution of the incident distribution with the array response. By removing the effect of the array response an improved estimate of the incident wave-number spectrum may be obtained. In particular the method of progressive substitutions has been widely used to deconvolve array window. By assuming all the incident signals to be a linear superposition of a finite number of plane waves this method is extended to deconvolve the narrowband beam outputs of a conventional beamformer. Two methods are used, the first to deconvolve the complex beam amplitudes and the second to deconvolve the beam powers. The convergence of these proposed interactive solutions is proved and the relationship of the limits to some recently proposed quadratic estimators is shown. (Author)

BDX-613-2339 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Improvement of External Lead Bond and Flexure Strengths by Comparing Lead Base Materials.
R. J. Blazek, and W. A. Piper. Apr 80, 8p CONF-800410-4
Contract AC04-76DP00613
Electronic component conference, San Francisco, CA, USA, 28 Apr 1980.

Four types of copper alloys used as external leads for hybrid microcircuits were tested and evaluated to determine which base material properties produced the most improved bond and flexure strengths as ccmpared with a standard lead material. (ERA citation 05:031074)

BDX-613-2393 PC **A03**/MF **A01**
Bendix Corp., Kansas City, MO.
Thin Film Gold Etchant Formulation and Rinse Removal. Final Report.
M. K. Raut. Jul 80, 39p
Contract AC04-76DP00613

The chemistry of gold etchant solutions used in photolithography of thin film networks (TFNs) for hybrid microcircuits was reviewed. The formulation and operating limits were revised to ensure that the initial solution makeup is always within required values for iodine concentration and specific gravity and that the etchant will not be used for an extended period of time. Rinsing procedures for removal of the gold etchant from the TFNs were evaluated. Increasing the rinse time beyond 15 seconds in deionized water does not significantly improve the removal of iodine. Nitrogen bubble burst, increased temperature of the rinse water, methyl alcohol rinse, and potassium iodide solution prerinse were shown to be effective in improving the rinse removal of iodine. Production requirements for stripping time for wet photoresist were shown to be more than three times longer than necessary to ensure that the photoresist was completely removed. (ERA citation 05:031075)

BDX-613-2422 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Multilayer Printed Wiring Board Lamination.
J. W. Lula. Jun 80, 25p
Contract AC04-76DP00613

The relationship of delamination resistance of multilayer PWBs made from GF material to manufacturing process variables was investigated. A unique quantitative test method developed during this project shows that delamination resistance is highly sensitive to material conditioning, to innerlayer surface treatment, and to post-lamination storage conditions, but is relatively insensitive to cure cycle variations. (ERA citation 05:030933)

IPPJ-DT-59 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Trial Manufacture of an Insulated Amplifier.
Shigeo Okuno, and Kiyokata Matsuura. Oct 78, 12p
In Japanese.
U.S. Sales Only.

Trial manufacture of an insulated amplifier was carried out. The input signals are divided by filters Th and Tl into high frequency component and low frequency component. The high frequency component drives a transformer T sub 1 , and secondary signals are induced. The low frequency component drives a transformer T sub 2 through a buffer and a modulator. The secondary signals from both transformers are recombined to make the output signals. Compensation for the frequency characteristics of the high frequency transformer and that for the effect of a filter in the demodulation circuit for low frequency component are considered. The time constant of output signals for rectangular input signals was 30 microsec, when only the low frequency part is operated. The drift of the direct current level is within 5 mV. The characteristic features of the high frequency part was also investigated. The overall characteristic features of this amplifier were good for the frequency range of 0 to 500 kHz. (Atomindex citation 11:506729)

JINR-13-11676 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Current Supply Programmer.
L. Jansak, F. Stofanik, and F. Chovanec. 1978, 7p
In Russian.
U.S. Sales Only.

A programmer for pulse superconducting magnet current supplies control is described. The programmer consists of pulse generator, trigger, interval timer and output amplitier. The programmer generates single as well as periodic triano.ular pulses. The form of the pulses can be symmetric. The duration of the pulse can be varied from 0.25 up to 1400 amplitude of the pulse from zero to 9 V, the pause time from 2 ms to 10s. The maximal output power of the programner is 6 W. (Atomindex citation 10:430997)

N80-29544/7 PC **A07**/MF **A01**
Texas Instruments, Inc., Dallas. Equipment Group.
Report for Simultaneous, Multiple Independently Steered Beam Study for Airborne Electronically Steerable Phased Array (Aespa) Program.
Final Report.
May 78, 129p NASA-CR-161394, EM-911-05-78
Contract NAS8-32627

Design concepts of an array for the formation of multiple, simultaneous, independently pointed beams for satellite communication links were investigated through tradeoffs of various approaches which were conceived as possible solutions to the problem. After the preferred approach was selected, a more detailed design was configured and is presented as a candidate system that should be given further consideration for development leading to a preliminary design. This array uses an attenuator and a phase shifter with every element. The aperture excitation necessary to form the four beams is calculated and then placed across the array using these devices. Pattern analysis was performed for two beam and four beam cases with numerous patterns being presented. Parameter evaluation shown includes pointing accuracy and beam shape, sidelobe characteristics, gain control, and beam normalization. It was demonstrated that a 4 bit phase shifter and a 6 bit, 30 dB attenuator were sufficient to achieve adequate pattern performances. The phase amplitude steered multibeam array offers the flexibility of 1 to 4 beams with an increase in gain of 6 dB if only one beam is selected.

N80-29598/3 PC **A03**/MF **A01**
Siemens A.G., Munich (Germany, F.R.). Research Lab.
Large Scale Integrated MOS Circuits with Narrow Structures: Investigation of Semiconductor Effects.
Final Report.
H. Boroffka. Dec 79, 43p BMFT-FB-T-79-67, ISSN-0340-7608
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Laboratory work was undertaken in order to attain better reverse current quality in MOS devices. Results show that attention must be paid to the condition of the back side of the slices where impurities may be gettered. The proper preparation of the back side gives carrier life times of 300 microsec which are reproducible. The subthreshold current behavior starts to be substantially influenced by the gate length if the gate length is shorter than a certain value, e.g., approximately 3 microns for 4 ohms cm substrate material. After implanting boron for threshold voltage adjustment and annealing at 500 C the reverse current is enhanced by more than one order of magnitude. Varying the annealing temperature a minimum for the reverse current is found after annealing at 800 C, while the original values of implanted samples are roughly reached. A generally applicable mathematical procedure was also developed allowing the prediction of the behavior of a given device structure. Results show that the surface generation current decreases monotonically with decreasing gate length.

N80-29600/7 PC **A05**/MF **A01**
Philips Zentrallaboratorium G.m.b.H., Hamburg (Germany, F.R.). Roehren- und Halbleiterwerke.
Measurement Techniques for Integrated High Frequency Circuits.
Final Report.
P. Draheim. Dec 79, 98p BMFT-FB-T-79-75
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

In an approach to submicron geometries, measurement methods for capacitors of capacitance smaller than 1 pF and for X modulation were developed. Together with these techniques, a process for implementing a p-n isolated high frequency transistor in a DIL 16 assembly mounted on a ceramic substrate was considered. Test results show that this air isolation process gives transistors with a transient frequency of 9 Ghz. the geometry of the transistor emitters is 2 microns. Furthermore, by modification of the p-n isolation process, Schottky ringmixers (cutoff frequency 8 GHz) and tunable diodes were realized. The possibility of combining high frequency transistors. Schottky ringmixers, and/or tunable diodes in one chip thus follows.

N80-29601/5 PC **A08**/MF **A01**
AEG-Telefunken, Backnang (Germany, F.R.). Fachbereich Weitverkehr und Kabeltechnik.
Universal Building Blocks for Tantalum Thin Film Technology.
Final Report, Dec. 1976.
W. Bonk, H. Griesinger, and G. Ketterer. Dec 79, 167p BMFT-FB-T-79-76
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

From a single amplifier RC filter, configuration circuits accomplishing the typical second degree transfer functions such as lowpass, highpass, bandpass, allpass, and band reject are derived and optimized with respect to sensitivity. The introduction of an additional amplifier leads to a filter concept for higher pole-Q s. The individual filter circuits are combined in highly versatile standard building blocks which can be adjusted to a specific application by means of trimming resistors and appropriate external interconnections. Tantalum film

technology was used in developing the hardware of the building blocks. Resistors were made of TaN and TaON. For the capacitors beta-Ta was used initially as the basic material. Later on N-doped Ta was introduced due to its superior properties. Results meet the design objectives for the thin film network being small size, high precision, and good temperature, as well as longterm stability.

N80-29602/3 PC **A04/MF A01**
Siemens A.G., Munich (Germany, F.R.). Unternehmensbereich Bauelemente.
Mos-Lsi Development Problems.
Final Report, Sep. 1977.
K. Arnold, H. Gueckel, H. E. Longo, H. Panholzer, and P. Rademeyer. Dec 79, 61p BMFT-FB-T-79-80
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Process engineering problems related to the development of CMOS gates and P-type MOS gates are studied. Existant manufacturing techniques are evaluated and improved as to yield, cost, and production time. Also improved is the quality of the MOS integrated circuits which are fabricated using these processes. Main results center on changes in cleaning procedures, the use of 3 in. instead of 2 in. silicon wafers for photolithography, ion implantation, metallization, and process control to stabilize electric parameters of the integrated circuits.

PATENT-4 210 871 Not available NTIS
Department of the Navy Washington DC
Optimum Diversity Combining Circuit for a Plurality of Channels.
Patent,
Eugene R. Hill, and Eugene L. Law. Filed 1 Sep 78, patented 1 Jul 80, 11p AD-D007 430/2, PAT-APPL-939 163
Supersedes PAT-APPL-939 163-78, AD-D005 383.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention consists of an AM/AGC weighted diversity combiner utilizing the AGC and AM voltages from the AGC loops of a plurality of receivers for generating an optimum weighting signal or combining ratio.

PATENT-4 210 881 Not available NTIS
Department of the Navy Washington DC
Millimeter Wave Microstrip Triplexer.
Patent,
David Rubin. Filed 9 Nov 78, patented 1 Jul 80, 4p AD-D007 429/4, PAT-APPL-959 383
Supersedes PAT-APPL-959 383-78, AD-D005 599.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a planar millimeter wave microstrip triplexer for separating three contiguous bands of frequencies (lower, middle and upper bands). The middle band is separated by the use of a diplexer comprising two quadrature couplers connected by dual identical planar bandpass filter sections. A second diplexer comprised of two edge-coupled filter sections is connected to the isolated port of the input quadrature coupler of the first diplexer. Signal components contained in the upper and lower frequency bands appear at the respective outputs of the second diplexer.

PATENT-4 213 029 Not available NTIS
Department of the Navy Washington DC
Radiation Transmissive Housing Having a Heated Load Bearing Gasket.
Patent,
Donald L. Endicott, Jr., and Jerry D. Stachiw.
Filed 21 Feb 79, patented 15 Jul 80, 9p AD-D007 427/8, PAT-APPL-6-013 719
Supersedes PAT-APPL-6-013 719, AD-D005 975.
Availability: This Government-owned invention Available for U.S. licensing and, possibly, for foreign licensing. Copy of Patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An apparatus for protectively housing radiation transmitting or receiving equipment is provided with a window in the form of a spherical segment, which is formed of material transmissive to radiation of the frequencies of the equipment, and which has a seating surface. A mounting for providing forces to support the window and to resist external pressure applied thereto has a bearing surface, and a heated bearing gasket abutts both the bearing and seating surface. The gasket is provided for resisting wear between the bearing and seating surfaces, and also for transferring selected amounts of heat to the window. A heat regulator is coupled between the window and the gasket to control the amount of heat transferred to the window by the gasket, and structure is provided for continuously joining the window, the mounting and the gasket.

PATENT-4 213 099 Not available NTIS
Department of the Navy Washington DC
Hydrophone Preamplifier and Calibration Circuit.
Patent,
Craig K. Brown. Filed 20 Nov 78, patented 15 Jul 80, 9p AD-D007 425/2, PAT-APPL-962 406
Supersedes PAT-APPL-962 406-78, AD-D005 741.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The present invention comprises a hydrophone preamplifier for coupling to a remote load and DC voltage supply through a single 2-wire cable. The preamp comprises a hybrid amplifier having a high-impedance input stage comprising a reverse-biased junction FET and an amplifier transistor output stage, the output voltage being fed to a current driver stage which is in series with the remote DC supply voltage and low-valued load resistor. The preamp completely controls the cable current, both supply and signal, by use of a constant-current diode which is inserted in the DC voltage supply line between its connection to the current-driver and the amplifier. A diode (zener diode) in parallel with a capacitor is placed across the amplifier from its dc supply voltage side to its ground side to compensate for differences in the constant-current supply from the constant-current diode and the varying current demanded by the amplifier. To couple in an AC calibration signal which is superimposed on a DC level, an optoisolator is connected to the preamplifier input so that its output signal is in series with the hydrophone signal (although only one signal is used at a time). In an array of hydrophones and preamps, the optoisolators are connected in series so that only a single calibration source is required and each preamp receives the same calibration signal. (Author)

PATENT-4 213 131 Not available NTIS
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Scannable Beam Forming Interferometer Antenna Array System.
Patent,
J. A. Kaiser, Jr. Filed 14 May 79, patented 15 Jul 80, 6p N80-28578/6, PAT-APPL-6-039 031
Supersedes PAT-APPL-6-039 031, N79-26252 (17 - 17, p 2249).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An antenna array is described which comprises three interferometer pairs of antenna elements with selected spacings made to form a single beam which is readily scannable. All spatial frequencies generated by a signal and intercepted by the array are derived from a signal processing technique applied to the array. The array samples space in the spatial frequency domain while the signal processing technique utilizes real time convolution of functions in the spectral frequency domain. Summation of the appropriate spatial frequencies is equivalent to a Fourier transform operation, yielding the location of the signal source in space. Resolution and freedom from interference of the interferometer system is equal to that of a fully filled array of the same aperture size containing element spacings of one half wavelength. An antenna array system comprising four antenna elements forming six interferometer pairs with a resolution equal to that of a sixteen element array with spacings of one half wavelength is described, as well as other multiples of one quarter wavelength of partial multiples of a wave length.

PB80-850589 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Reliability of Integrated Circuits. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 47p
NERACIAANT0263
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles cover topics on reliability or fatigue life of electronic circuits subjected to temperature cycling in an environmental chamber. (Contains 053 citations.)

PB80-851207 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Encapsulation of Electronic Circuits. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Aug 80, 126p
NERACUSGNT0390
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which discuss the encapsulation of electronic circuits, including microcircuits and integrated circuits, and of other electronic equipment, such as solar cells and arrays, semiconductors, transformers and power supplies. Failure rate, performance testing and evaluation, electric properties, temperature effects and characterization of encapsulants (epoxies, polymers, glass, etc.) are discussed as well. (Contains 117 citations.)

PB80-851579 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Phase Locked Loop. May, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for May 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 115p
NERACUSGNT0538
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design, test, development, and application of various phase locked loop circuits and devices. (Contains 114 citations.)

PB80-851587 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Phase Locked Loop. May, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for May 74-May 80,
Howard L. Ogushwitz. Jun 80, 150p
NERACIAANT0538
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design, test, development, and application of various phase locked loop circuits and devices. (Contains 171 citations.)

PB80-851595 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Phase Locked Loop. November, 1976-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Nov 76-Jun 80,
Howard L. Ogushwitz. Jun 80, 182p NERACEI NT0538
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design, test, development, and application of various phase

locked loop circuits and devices. (Contains 183 citations.)

PB80-851637 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Hybrid Microelectronic Circuits. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 98p
NERACIAANT0685
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design and application of hybrid microelectronic circuits in such areas as telecommunications, electric motors, NASA space shuttle program, etc. (Contains 065 citations.)

PB80-851645 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Hybrid Microelectronic Circuits. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 52p
NERACEDBNT0685
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design and application of hybrid microelectronic circuits in such areas as telecommunications, electric motors, NASA space shuttle program, etc. (Contains 042 citations.)

PB80-852460 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photomultiplier Design and Performance. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jun 80, 149p
NERACIAANT0607
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design, performance, and application of photomultiplier devices to such topics as laser and fiber optics communication, low-energy imaging detectors, astronomical photometry, etc. (Contains 099 citations.)

PB80-852478 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photomultiplier Design and Performance. March, 1975-June, 1980 (Citations from the NTIS Data Base).
Rept. for Mar 75-Jun 80,
Howard L. Ogushwitz. Jun 80, 221p
NERACUSGNT0607
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design, performance, and application of photomultiplier devices to such topics as laser and fiber optics communication, low-energy imaging detectors, astronomical photometry, etc. (Contains 159 citations.)

PB80-852486 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photomultiplier Design and Performance. April, 1971-May, 1980 (Citations from the Energy Data Base).
Rept. for Apr 71-May 80,
Howard L. Ogushwitz. Jun 80, 196p
NERACEDBNT0607
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design, performance, and application of photomultiplier devices to such topics as laser and fiber optics communication, low-energy imaging detectors, astronomical photometry, etc. (Contains 142 citations.)

PB80-852494 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photomultiplier Design and Performance. April, 1978-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Apr 78-Jun 80,
Howard L. Ogushwitz. Jun 80, 174p NERACEI NT0607
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design, performance, and application of photomultiplier devices to such topics as laser and fiber optics communication, low-energy imaging detectors, astronomical photometry, etc. (Contains 119 citations.)

PB80-852825 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Aircraft Antennas. June, 1974-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 74-Jun 80,
Howard L. Ogushwitz. Jun 80, 223p
NERACUSGNT0536
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the design and application of aircraft communication, navigation and experimental antennas. (Contains 200 citations.)

PB80-852833 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Aircraft Antennas. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 125p
NERACIAANT0536
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the design and application of aircraft communication, navigation and experimental antennas. (Contains 139 citations.)

PB80-855406 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Transistor-Transistor Logic. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jul 80, 85p
NERACIAANT0914
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the application of transistor-transistor logic to all forms of logic networks. Discussions on fabrication, design, and speed of this family of logic circuits are also presented. (Contains 081 citations.)

PB80-855414 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Transistor-Transistor Logic. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 94p
NERACUSGNT0914
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the application of transistor-transistor logic to all forms of logic networks. Discussions on fabrication, design, and speed of this family of logic circuits are also presented. (Contains 076 citations.)

PB80-855422 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Transistor-Transistor Logic. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 120p NERACEI NT0914
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the application of transistor-transistor logic to all forms of logic networks. Discussions on fabrication, design, and speed of this family of logic circuits are also presented. (Contains 144 citations.)

PB80-855463 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Flip-Flop Circuits. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 154p
NERACIAANT0922
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations cover the broad spectrum of uses of flip-flop circuitry. Specific items discussed are, J-K, set/reset, CMOS and high speed flip-flops. Applications, logic systems, and instrumentation are also presented. (Contains 160 citations.)

PB80-855471 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Flip-Flop Circuits. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 177p
NERACUSGNT0922
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations cover the broad spectrum of uses of flip-flop circuitry. Specific items discussed are, J-K, set/reset, CMOS and high speed flip-flops. Applications, logic systems, and instrumentation are also presented. (Contains 175 citations.)

PB80-855489 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Flip-Flop Circuits. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 49p
NERACEDBNT0922
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations cover the broad spectrum of uses of flip-flop circuitry. Specific items discussed are, J-K, set/reset, CMOS and high speed flip-flops. Applications, logic systems, and instrumentation are also presented. (Contains 045 citations.)

PB80-855497 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Flip-Flop Circuits. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 107p NERACEI NT0922
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations cover the broad spectrum of uses of flip-flop circuitry. Specific items discussed are, J-K, set/reset, CMOS and high speed flip-flops. Applications, logic systems, and instrumentation are also presented. (Contains 128 citations.)

PB80-855521 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Emitter Coupled Logic. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 74p NERACEI NT0902
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations deal with the circuit design, reliability and application of emitter coupled logic. Interfacing with TTL, LSI layout and use in fast circuitry are also discussed. (Contains 077 citations.)

PB80-855612 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Flexible Circuits. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 57p NERACEI NT0903
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the structural design and fabrication of bendable, or flexible, printed wiring boards and circuits. (Contains 061 citations.)

PB80-856693 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Data Display Devices. April, 1978-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Apr 78-Jun 80,
William V. Sassi. Jun 80, 189p NERACEI NT0974
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the design, application and precision of data display devices. Citations include applications to computers, color displays, simulator visual systems, L.E.D. displays and human and biomedical engineering. (Contains 200 citations.)

PB80-859952 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Micropower Active Filters. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 23p NERACEI NT0870
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the design and application of various types of active filters. Among the types of filters discussed are inductorless filters, RC-amplifier filters, and time-multiplexed active filters. (Contains 128 citations.)

9F. Telemetry

PB80-850878 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radio Telemetry. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 180p
NERACIAANT0250
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe topics on radio telemetry, and its application to aviation, radar systems, spaceborne astronomy, etc. (Contains 179 citations.)

PB80-850886 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radio Telemetry. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 85p
NERACUSGNT0250
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe topics on radio telemetry, and its application to aviation, radar systems, spaceborne astronomy, etc. (Contains 076 citations.)

PB80-850894 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radio Telemetry. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 30p NERACEI NT0250
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe topics on radio telemetry, and its application to aviation, radar systems, spaceborne astronomy, etc. (Contains 025 citations.)

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A088 532/7 PC **A03**/MF **A01**
Wisconsin Univ-Madison Dept of Chemistry
Luminescent Tellurium-Doped Cadmium Sulfide Electrodes as Probes of Semiconductor Excited-State Deactivation Processes in Photoelectrochemical Cells.
Technical rept.,
Arthur B. Ellis, Bradley R. Karas, and Holger H. Streckert. 12 Aug 80, 30p Rept no. TR-3
Contract N00014-78-C-0633

Correlations between quantum efficiencies for photocurrent (phi (x)), emission (phi r), and nonradiative recombination (phi (nr)) are discussed with reference to data from single-crystal, n-type, 100 and 1000 ppm CdS:Te-based photoelectrochemical cells (PECs) employing aqueous sulfide electrolyte. These materials emit while they serve as PEC electrodes. The assumption that the proportionality of phi (r) to phi (nr) is unaffected by potential leads to a simple expression relating phi (x) to phi (r) for monochromatic excitation. Calculated and observed emission data are in reasonable agreement; sources of deviation are discussed. Polychromatic excitation is shown to yield photocurrent and emission intensity which is approximately a weighted average of the values obtained with the constituent monochromatic frequencies. Practical implications of the phi (x) correlation with phi (r) are described, as are related results from other PECs. (Author)

AECL-6352 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Evolution in R and D Programs.
A. J. Mooradian. Aug 78, 10p CONF-7806125-8
1978 annual conference of the Canadian Nuclear Association, Ottawa, Canada, 11 Jun 1978.
U.S. Sales Only.

As with any major enterprise of broad social significance, nuclear power faces three tests of viability - technical, economic and political. All three criteria impinge on the R and D programs required in support of a healthy industry. In the past the focus has been on technical and economic factors. With the maturing of the industry, the R and D base required to maintain technical and economic viability has grown. Simultaneously political factors are now commanding increased attention. This paper reviews the Canadian R and D program and its evolution in response to the needs of a maturing industry. (Atomindex citation 10:492377)

AED-Conf-77-193-002 PC **A02**/MF **A01**
Rheinisch-Westfaelisches Elektrizitaetswerk A.G., Essen (Germany, F.R.).
Economic Growth and Energy Consumption.
F. Gieske. 1977, 18p CONF-770489-3
In German.Meeting in connection with the Hannover fair target conflict-energy demand-environment, Hannover, F.R. Germany, 20 Apr 1977.
U.S. Sales Only.

The factors making further growth necessary are explained, and the problems resulting from reduced economic growth - on the basis of a prognosed value of 3.5% for the gross national product until 1990 - are discussed. Some guidelines and targets are given whose observance is necessary to meet the energy demands of the future. (Atomindex citation 09:371227)

AED-Conf-77-193-003 PC **A02**/MF **A01**
Cologne Univ. (Germany, F.R.).
Energy Reserves of Our Planet.
G. Bischoff. 1977, 13p CONF-770489-2
In German.Meeting in connection with the Hannover fair target conflict-energy demand-environment, Hannover, F.R. Germany, 20 Apr 1977.
U.S. Sales Only.

Starting from a prognosis for the development of the world energy consumption, the situation of special primary energy sources (reserves, potential) is briefly described. According to the amount and location of the reserves - 90% of the fossil energy reserves are in industrialized countries -, coal will play a leading role in meeting the energy demands of the future. Without breeder reactors, the role of nuclear energy will be limited in time. (Atomindex citation 09:371217)

ANL/CNSV-TM-38 PC **A07**/MF **A01**
American Planning Association, Chicago, IL.
Energy-Conserving Development Regulations: Current Practice.
May 80, 138p
Contract W-31-109-ENG-38

Almost every aspect of land development has an effect on energy use, from minute architectural details to broad considerations of urban density. Energy-efficiency depends in part on how development is planned and carried out. Conventional development regulations, such as zoning ordinances and subdivision regulations, can be adapted in many ways to promote energy conservation at the community level. This report is about energy-efficient site and neighborhood design. It examines recent experiences of local governments that have adopted new development regulations or amended existing ones to promote energy conservation, more efficient generation and distribution, or a switch to alternative, renewable sources. Although much has been written in recent years about saving energy through community design, actual experience in applying these new ideas is still limited. To date, most communities have focused their efforts on studying the problem, documenting consumption patterns, and writing reports and plans. Only a handful have amended their land-use controls for the express purpose of saving energy. This study identifies 13 of these pioneering communities, after undertaking a survey of over 1400 local, regional, and state planning agencies. It takes a look at their experiences, to learn what has been done, how well it has worked, and what problems have been encountered. (ERA citation 05:027366)

BNL-27862 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Industry Process Models: Applications for Market Penetration and Energy Use Projections.
D. A. Pilati, S. O. Howe, C. Balzer, and F. T. Sparrow. May 80, 22p CONF-800565-2
Contract AC02-76CH00016
TIMS/ORSA national meeting, Washington, DC, USA, 4 May 1980.

The Brookhaven National Laboratory pulp and paper industry process model is used to project market penetration of energy conserving technologies and purchased energy for the paper industry. The risk adjusted discount rate concept is incorporated to penalize the capital costs of unproven technologies. For this analysis, the production-cost minimization objective is relaxed to explore near-minimum cost industry alternatives. Allowing paper production to include all possibilities within

1% of the absolute minimum costs results in very significant variations in both projected market penetration levels and energy use. Industry model results relying solely on the cost minimization objective for market penetration and energy demand forecasts may be highly suspect. (ERA citation 05:027340)

BNL-51163 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Staff Roster for 1979: Energy Technology Programs.
Dec 79, 57p
Contract AC02-76CH00016

Brief resumes of personnel involved in BNL Energy Technology programs are presented. (ERA citation 05:031422)

BNL-51165 PC **A04**/MF **A01**
National Center for Analysis of Energy Systems, Upton, NY.
National Center for Analysis of Energy Systems: Program Summaries for 1979.
Dec 79, 70p
Contract AC02-76CH00016

This Center, founded in January 1976, is one of four areas comprising the Department of Energy and Environment at Brookhaven National Laboratory. The major ongoing activities of the Center concern integrated, quantitative analyses of technological, economic, and environmental aspects of energy at the regional, national, and international levels. The objectives, activities, and sources of support of each of the programs are described and the major accomplishments during the year are outlined. Some of the planned future activities of the Center are indicated, and recent publications are listed. (ERA citation 05:029167)

BNL-51166 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Staff Roster for 1979: National Center for Analysis of Energy Systems.
Jan 80, 70p
Contract AC02-76CH00016

This publication is a compilation of resumes from the current staff of the National Center for Analysis of Energy Systems. The Center, founded in January 1976, is one of four areas within the Department of Energy and Environment at Brookhaven National Laboratory. The emphasis of programs at the Center is on energy policy and planning studies at the regional, national, and international levels, involving quantitative, interdisciplinary studies of the technological, economic, social, and environmental aspects of energy systems. To perform these studies the Center has assembled a staff of experts in the areas of science, technology, economics planning, health and safety, information systems, and quantitative analysis. (ERA citation 05:031423)

CONF-800111-4 PC **A02**/MF **A01**
Argonne National Lab., IL.
Concentrated Vs. Distributed Energy: Employment Based Community Level Differences.
L. J. Hoover, D. J. Santini, K. K. Smeltzer, and E. J. Stenehjem. 1980, 14p
Contract W-31-109-ENG-38
Annual conference of the American Association for the Advancement of Science, San Francisco, CA, USA, 4 Jan 1980.

Consideration is given to the differences between concentrated options (central station electric, synfuels) and distributed options (SHACOB) for residential space conditioning. Employment, geographic location, community stability, and locational equity are the factors discussed. (ERA citation 05:029235)

CONF-800381- PC **A04**/MF **A01**
Tata Energy Research Inst., Bombay (India).
Annual General Meeting and Seminar on (I) Utilization of Agricultural Residues for Paper and Board; (II) Capacity Utilization and Energy Conservation.
1980, 67p
Annual general meeting and seminar on utilization of agricultural residues for paper and board, New Delhi, India, 29 Mar 1980.
U.S. Sales Only.

Six papers were presented at the meeting. A separate abstract was prepared for each paper. (ERA citation 05:030812)

CONF-800486-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Effect of a Sudden Fuel Shortage on Freight Transport in the United States: An Overview.
J. N. Hooker. 1980, 31p
Contract W-7405-ENG-26
National energy users conference for transportation, San Antonio, TX, USA, 13 Apr 1980.

A survey was made of the potential effects of a sudden reduction of fuel supplies on freight transport via truck, rail, water, and pipeline. After a brief discussion of the energy characteristics of each of these modes of transport, short-term strategies for making better use of fuel in a crisis are investigated. Short-term is taken to mean something on the order of six months, and a crisis is taken to be the result of something on the order of a 20% drop in available fuel. Although no succinct or well-established conclusions are drawn, the gist of the paper is that the potential for short-term conservation, without a serious disruption of service, exists but does not appear to be large. It is remarked that it is possible, through further study, to obtain a fairly accurate reckoning of the physical ability of the freight transport network to weather a fuel crisis, but that it is impossible to say in advance what freight carriers will in fact do with the network. (ERA citation 05:029250)

CONF-800548-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Interfuel Substitution Model for Institutions of Higher Education: Implications for Conservation.
S. M. Cohn, D. L. O'Neal, and R. L. Perry. 1980, 21p
Contract W-7405-ENG-26
Eastern Economic Association annual meeting, Montreal, Quebec, Canada, 8 May 1980.

A model of interfuel substitution is described for colleges and universities in the United States and its implications for conserving fossil fuel resources. There is a significant and growing interest among institutions of higher education in utilizing more efficiently their purchased as well as generated energy sources. An analysis of energy consumption patterns of colleges and universities shows a significant difference in how energy sources are being utilized. Smaller colleges and universities convert purchased fuels directly into end use services such as space heating, water heating, and lighting. The purchased fuels may include electricity and fossil fuels. A more varied fuel use situation exists for larger institutions where not only the above fuel consumption mixture exists, but a central generating plant operated by the university may exist which uses purchased fossil fuels in a primary energy use sense to generate electricity, steam, and chilled water for their own end use requirements. Results indicate that relative changes in fuel prices across a broad cross-section of colleges and universities have significant effects on primary and end-use consumption of fuels. Increasing prices of distillate and residual fuels have a greater energy conservation potential than do equal price increases for coal and natural gas. Electricity is found not to have significant substitution possibilities with the fossil fuels. The results have important overtones for public policy. The structure of the market system may be well suited to handle dislocations in energy price and supplies for colleges and universities; and future decisions by public policy makers may reflect this situation. (ERA citation 05:027325)

CONS-4212-T1 PC **A06**/MF **A01**
Reimann-Buechner Partnership, Syracuse, NY.
Energy-Conserving Site-Design Case Study, Radisson, New York. Appendix.
Dec 79, 102p
Contract EM-78-C-01-4212

Materials included in this Appendix to Final Report to CONS-4212-T2) provide support and background data for the body of that report. Data selected for inclusion are intended to provide background analysis or to clarify methodology. In most instances, the Appendix information is referenced to the body of the final report. Sections are devoted to: climate; building design data;energy-simulation data; and resources and contracts. 36 references. (ERA citation 05:029264)

CONS-4212-T2 PC **A08**/MF **A01**
Reimann-Buechner Partnership, Syracuse, NY.
Energy-Conserving Site-Design Case Study, Radisson, New York. Final Report.
Dec 79, 155p
Contract EM-78-C-01-4212

Radisson is a 2,950-acre new community currently being developed by the New York State Urban Development Corporation and located in central New York, 12 miles north-west of Syracuse. Case-study sites selected for this project are a 95-acre residential site and the 51-acre Town Center of the new community. Development on the Residential Site is a low-density (2.8 dwelling units/acre) mixture of single-family, townhouse and multi-family units. Development on the Town Center site is a mixture of small-scale commercial use (144,000 sq. ft.) and 330+ multi-family dwelling units. Energy-conserving plans developed for both sites have focused on passive measures to reduce energy use for space heating. Utility-system options have been identified for both sites, but require further study as to feasibility and cost. This report summarizes energy savings and cost differentials due to passive measures incorporated in both the residential and Town Center Plans. The future implementation schedule, also discussed, summarizes the procedures an schedule required for implementation of the passive measures, as well as further study required for the development of utility-system options. 4 tables. (ERA citation 05:029265)

CONS-4214-T1 PC **A08**/MF **A01**
Woodlands Development Corp., Houston, TX.
The Woodlands Metro Center Energy Study. Case Studies of Project Planning and Design for Energy Conservation.
Mar 80, 164p
Contract EM-78-C-01-4214

The Woodlands is a HUD Title VII New Town located near Houston, including 22,000 acres; the plan for the new town consists of 6 residential villages, a town center (Metro), and a Trade Center for larger-scale industrial use. Included within the program for each village are schools and commercial activities, as well as employment activities. The Woodlands is planned to be developed over a 26-year period (commenced in 1972) with an ultimate population of 150,000. Following a summary chapter, Chapter II presents background material on The Woodlands and results of the study are summarized. Chapter III describes the project team and its organizational structure. Chapter IV outlines and documents the methodology that was employed in developing, analyzing, and evaluating the case study. The next chapter describes and analyzes the conventional plan, documents the process by which energy-conserving methods were selected, and evaluates the application of these methods to the Metro Center Study area. Chapter VI discusses constraints to implementation and is followed by a final chapter that presents the general conclusions from the case study and suggests directions for further investigation. (ERA citation 05:029266)

CONS-4214-T1(App.1) PC **A13**/MF **A01**
Woodlands Development Corp., Houston, TX.
The Woodlands Metro Center Energy Study. Case Studies of Project Planning and Design for Energy Conservation.
Mar 80, 295p
Contract EM-78-C-01-4214

Appendix I for The Woodlands Metro Center Energy Study near Houston consists of a computer model (Program ENERCALC) for parcel level analysis (data sources and definitions, ENERCALC Program description, assumptions, and variables evaluated for Energy Plan); computer model results of Program ENERCALC (conventional plan and energy plan); life cycle cost analysis and energy savings by building type; summary of energy savings and costs; application of building envelope and site design modifications (strategies and parcel-by-parcel application and estimated

savings); and energy supply system payback calculations. (ERA citation 05:029267)

CONS-4214-T1(App.2) PC A13/MF A01
Woodlands Development Corp., Houston, TX.
The Woodlands Metro Center Energy Study. Case Studies of Project Planning and Design for Energy Conservation.
Mar 80, 286p
Contract EM-78-C-01-4214

Appendix II of The Woodlands Metro Center Energy Study near Houston consists of the following: Metro Center Program, Conventional Plan Building Prototypes and Detail Parcel Analysis, Energy Plan Building Prototypes, and Energy Plan Detail Parcel Analysis. (ERA citation 05:029219)

DOE/AD-0010/10 PC A04/MF A01
Department of Energy, Washington, DC. Director-ate of Administration.
Selected DOE Headquarters Publications, October 1979.
Jul 80, 61p

This publication provides cumulative listings of and an index to DOE headquarters publications issued since October 1979. Three types of headquarters publications are included: publications dealing mainly with program and policy that are attributed to and issued by headquarters organizations, reports prepared by contractors to describe research and development work they have performed for the Department, and environmental development plans and impact statements. Such items as pamphlets, fact sheets, bulletins, newsletters, telephone directories, headquarters publications issued under the DOE-tr and CONF codes, technical reports from the Jet Propulsion Laboratory and NASA issued under DOE/JPL and DOE/NASA codes, and weekly/monthly reports of the Energy Information Administration are not included. (ERA citation 05:031424)

DOE/AD/03871-T2 PC A05/MF A01
Little (Arthur D.), Inc., Cambridge, MA.
Residential/Commercial Market for Energy Technologies.
M. M. Glesk. Aug 79, 81p
Contract AC01-76PE03871

The residential/commercial market sector, particularly as it relates to energy technologies, is described. Buildings account for about 25% of the total energy consumed in the US. Market response to energy technologies is influenced by several considerations. Some considerations discussed are: industry characteristics; market sectors; energy-consumption characeristics; industry forecasts; and market influences. Market acceptance may be slow or nonexistent, the technology may have little impact on energy consumption, and redesign or modification may be necessary to overcome belatedly perceived market barriers. 7 figures, 20 tables. (ERA citation 05:030801)

DOE/CS/00115-T1 PC A05/MF A01
SRI International, Menlo Park, CA.
Transportation Energy Demand in Alternative Futures.
Jul 78, 87p
Contract AT03-76CS50115

Four alternative-futures scenarios (high and moderate growth, changing values, depression, and recovery) were developed, including key assumptions about economic, demographic, and social conditions, and about resource availability. These scenarios are used to provide a context for projecting transportation energy demand, and to provide a framework for other kinds of long-range studies of transportation energy use and related factors. Energy-demand projections, from the present through the year 2025, were made for each major mode of transportation - automobiles and personal trucks, buses, railroads, commercial trucks, aviation, and water transportation. A set of long-range scenarios and baseline projections of transportation energy demand consistent with each scenario was provided. These baselines are intended to serve as starting points for future analyses of various transportation energy-conservation strategies. A common alternative-futures scenario framework for future work is provided. The scenarios developed can be elaborated for closer study of different projections of regional-transportation energy use; they can serve as the bases for inputs to more-elaborate forecasting models; or they can serve as starting points for developing other scenarios of the future. (ERA citation 05:030808)

DOE/CS/30118-T2 PC A04/MF A01
American National Standards Inst., New York.
Minutes: ANSI Steering Committee on Solar Energy Standards Development.
29 Apr 80, 57p
Contract AC01-79CS30118

Minutes of the April 29, 1980, meeting of the American National Standards Institute steering committee on solar energy standards development are given. Attachments include correspondence from individuals and organizations which primarily describe the Solar Public Interest Coordination Committee (SPICC) and its recent activities. Also a report on the meeting of the ANSI subcommittee on international activity is attached. (ERA citation 05:030370)

DOE/CS/40167-T1 PC A06/MF A01
Johns-Manville Sales Corp., Denver, CO. Research and Development Center.
Demonstration of Energy Conservation for Multi-Deck Board Dryers. Phase I. Final Report.
8 Feb 80, 123p
Contract AC03-78CS40167

A study was made to determine the feasibility of recover and reuse of low level heat from the exhausts of multi-deck dryers used to dry boards in the building materials industry. There are approximately 1000 dryers of this type in the USA, with no heat recovery equipment. These dryers are used in the manufacture of: roof insulation board, ceiling tile and panel stock, wood fiber sheathing, gypsum board, and veneer plywood. Pilot scale tests and analyses show that heat recovery designs utilizing several types of heat exchange equipment are feasible. These include the following: indirect contact air-to-air heat exchangers for preheating combustion air for the dryer furnaces; direct contact air-to-water heat exchangers using water sprays to heat process water; and indirect contact air-to-liquid heat exchangers to heat recirculating liquid in a plant building heating system. The systems recommended for design and installation at the Rockdale plant include all three of the types of heat exchangers. The preliminary estimate for the installed cost for these systems at the Rockdale plant is $565,000 (1979 dllars). Annual heat recovery of 186,000 million Btu is projected with a value of $545,000 using gas costs of $3.00 per million Btu. Payback based on a discounted cash flow analysis using ten year depreciation is about two years. (ERA citation 05:024307)

DOE/CS/58439-1 PC A10/MF A01
United Technologies Corp., East Hartford, CT.
Modal Shifts in Short-Haul Passenger Travel and the Consequent Energy Impacts.
Mar 80, 209p
Contract AC01-76CS58439

A study was performed to evaluate the impacts of strategies to effect modal shifts in short-haul passenger travel (defined herein as intercity travel under 500 miles) from energy-intensive modes to those modes that are less energy-intensive. A series of individual strategies, ranging from incentives to the less energy-intensive modes (bus, rail) to penalties to the more energy-intensive modes (auto, air) was examined to determine energy saved and policy implications relative to strategy implementation. The most effective of the individual strategies were then combined in all permutations, and the analysis was repeated. As part of the analytical process, effects of factors other than energy (user cost and time, emissions, government subsidy, and travel fatalities) were examined in a benefit/cost analysis. Finally, energy savings, benefit/cost impacts, implementation considerations, and policy implications were evaluated to arrive at conclusions as to the effectiveness of the more-influential strategies and to the overall effectiveness of induced modal shifts. The principal conclusion of the study is that the maximum 1980 energy saving that might be realized by modal shifts, discounting the concurrent effects of demand suppression and improvement of mode efficiency, is approximately 83 x 10 exp 12 Btu (46,500 bbl gasoline per day), 3.8% of the total projected 1980 energy consumption in the short-haul transportation sector and 0.23% of the total US petroleum use. It was also concluded that strategies to achieve these small savings by modal shifts would result in significant economic, social, and business disruptions. (ERA citation 05:027331)

DOE/CS/62122-01 PC A04/MF A01
Price Waterhouse Co., Washington, DC.
Study of State Energy Conservation Program: 1979 Energy Savings Indicators.
Jun 80, 63p
Contract AC01-80CS62122

This study reviewed 1979 energy savings reports provided by states for conservation measures in four major categories of State Energy Conservation Program services, namely: (1) industrial, commercial, and institutional; (2) residential; (3) thermal and lighting; and (4) transportation. Conservation measures in these categories constitute a major portion of the total estimated 1980 savings for the State Energy Conservation Program. This study only addressed measures in these categories for which usable documentation had been submitted by states. Based on a review of measures supported by available documentation, the study estimates that energy savings associated with the conservation measures reviewed were 108 TBtu's for the calendar year 1979. These estimated energy savings for 1979 were converted into 540 million dollars for 1979 and 2.8 billion dollars over the projected life of the conservation measures. (ERA citation 05:027265)

DOE/EIA/CR-7405-01 PC A19/MF A01
Oak Ridge National Lab., TN.
End Use Energy Consumption Data Base: Transportation Sector.
J. N. Hooker, A. B. Rose, and D. L. Greene. Feb 80, 426p
Contract W-7405-ENG-26

The transportation fuel and energy use estimates developed a Oak Ridge National Laboratory (ORNL) for the End Use Energy Consumption Data Base are documented. The total data base contains estimates of energy use in the United States broken down into many categories within all sectors of the economy: agriculture, mining, construction, manufacturing, commerce, the household, electric utilities, and transportation. The transportation data provided by ORNL generally cover each of the 10 years from 1967 through 1976 (occasionally 1977 and 1978), with omissions in some models. The estimtes are broken down by mode of transport, fuel, region and State, sector of the economy providing transportation, and by the use to which it is put, and, in the case of automobile and bus travel, by the income of the traveler. Fuel types include natural gas, motor and aviation gasoline, residual and diesel oil, liuqefied propane, liquefied butane, and naphtha- and kerosene-type jet engine fuels. Electricity use is also estimated. The mode, fuel, sector, and use categories themselves subsume one, two, or three levels of subcategories, resulting in a very detailed categorization and definitive accounting. (ERA citation 05:030809)

DOE/EIA-0167(78) PC A04/MF A01
Department of Energy, Washington, DC. Energy Information Administration.
Gas Supplies of Interstate Natural Gas Pipeline Companies, 1978.
T. A. Pappas. Apr 80, 72p

This report on the gas supplies of interstate natural gas pipeline companies for caldendar year 1978 is the fifteenth report on the gas supplies of these companies. Total dedicated domestic gas reserves owned and controlled by interstate pipeline companies increased in 1978 by 1.1 trillion cubic feet, or 1.2 percent, from 92.9 trillion cubic feet at the beginning of the year to 94.0 trillion cubic feet at the end of the year. Total interstate reserve additions during 1978 were nearly 8.4 trillion cubic feet, compared with additions at 5.8 trillion cubic feet for 1977. The total net additions and revisions to reserves during 1978 was 12.0 trillion cubic feet. In this report this figure is also referred to as gross change in reserves. Only when the total net of additions and revisions is greater than production is

the volume of reserves increased. This is the first time that the total of additions and revisions is greater than the production since 1967 and is also the largest positive change since that year. Total gas purchased and produced from the dedicated domestic gas reserves is approximately the same as in 1977, 10.9 trillio cubic feet. The 1978 R/P ratio for the total domestic reserves and production was 8.7 as compared with the 1977 ratio of 8.5. This ratio has been declining throughout the fifteen year history of Form 15 reports. The ratio of gross change in reserves (revisions and additions) to production for 1978 was 1.10. For 1977 the comparable ratio was 0.51. When this ratio is less than unity, year-end reserves for that year will be less than the previous year. This ratio has exceeded unity for the first time since 1967. (ERA citation 05:027281)

DOE/ET/15350-T1 PC **A06**/MF **A01**
Biphase Energy Systems, Santa Monica, CA.
Design Study of a Two-Phase Turbine Bottoming Cycle. Final Report.
W. R. Studhalter. 15 Jun 79, 123p
Contract EY-76-C-03-1207

The use of a biphase turbine system to recover waste heat from diesel engines was examined and found to have many favorable attributes. Among these were low rpm, high torque, low heat exchanger cost, and simplicity. Several candidate working fluid combinations were tested at temperatures of interest. The contact heat exchanger concept was substantiated by large scale experiment. The program includes subscale tests of key hardware components of a biphase turbine bottoming system. These are the two-phase nozzle, two-phase turbine, and direct contact heat exchanger. A comprehensive cost analysis was completed. A three-year program leading to a full-size system field demonstration has been planned. Progress in the first year of this program and the effort started on the second year program are reported. (ERA citation 05:024309)

DOE/ET/20090-5 PC **A02**/MF **A01**
Solar Environmental Engineering Co., Inc., Fort Collins, CO.
Proposed SOLCOST Maintenance Activities.
17p
Contract AC02-77ET20090

This document provides a short description of work that has been accomplished to date and work in progress. A discussion of the program status as it is currently configured follows and finally proposed work by Solar Environmental Engineering Company (SEEC) in its most recently signed contract with the Department of Energy (DOE) is given. Early statements are designed to give the reader a good background so that the suggested SOLCOST maintenance activities will be more easily understood. (ERA citation 05:030517)

DOE/ET/29245-1 PC **A13**/MF **A01**
International Research and Technology Corp., McLean, VA.
Cavity Degradation Risk Insurance Assessment. Final Report.
C. Hampson, P. Neill, and L. de Bivort. 1980, 298p
Contract AC02-78ET29245

This study examined the risks and risk management issues involved with the implementation by electric power utilities of compressed air energy storage and underground pumped hydro storage systems. The results are listed in terms of relative risks for the construction and operation of these systems in different geologic deposits, with varying amounts of pressurization, with natural or man-made disasters in the vicinity of the storage equipment, and with different modes of operating the facilities. (ERA citation 05:030726)

DOE/ET/32052-T2(V.4) PC **A13**/MF **A01**
Nuclear Assurance Corp., Atlanta, GA.
International Data Collection and Analysis. Task 1.
Apr 79, 277p
Contract AC01-77ET32052

Commercial nuclear power has grown to the point where 13 nations now operate commercial nuclear power plants. Another four countries should join this list before the end of 1980. In the Nonproliferation Alternative Systems Assessment Program (NASAP), the US DOE is evaluating a series of alternate possible power systems. The objective is to determine practical nuclear systems which could reduce proliferation risk while still maintaining the benefits of nuclear power. Part of that effort is the development of a data base denoting the energy needs, resources, technical capabilities, commitment to nuclear power, and projected future trends for various non-US countries. The data are presented by country for each of 28 non-US countries. This volume contains compiled data on Mexico, Netherlands, Pakistan, Philippines, South Africa, South Korea, and Spain. (ERA citation 05:030773)

DOE/ET/60004-T1 PC **A10**/MF **A01**
Decision Focus, Inc., Palo Alto, CA.
Abbreviated RD and D Program Portfolio Selection Workbook.
D. W. Boyd, D. Cohan, and S. G. Regulinski. Dec 79, 214p
Contract AC05-79ET60004

A workbook for implementing an abbreviated version of the RD and D portfolio selection methodology described in A Resource Allocation Methodology for Establishing RD and D Budgetary Priorities is presented. The purpose of the abbreviated methodology is to allow a fast, first-cut analysis of a set of programs and to provide a means of discovering important issues that deserve more detailed analysis. The use of the abbreviated methodology in the overall process of evaluating RD and D programs is outlined. The effect of the program on a process is represented by the process model. Those process cost and performance characteristics that are important to the market for an energy product are described. The product cost model takes the cost and performance characteristics and the feedstock price and calculates the cost of producing a unit of energy using the technology in question. The market model takes this cost, the demand for the energy product, and the characteristics of alternative sources of the same product, and specifies the market share captured by the new technology. From this point it is relatively straightforward to infer the impacts of the new technology on the energy system. The benefit model evaluates the impacts in a consistent way, given the cost of the Federal support. (ERA citation 05:030753)

DOE/IA-0002T/5(80) PC **A03**/MF **A01**
Department of Energy, Washington, DC. Office of Current Reporting.
International Energy Indicators.
E. K. Bauer. May 80, 30p

International statistical tables and graphs are given for the following: (1) Iran - Crude Oil Capacity, Production and Shut-in, June 1974-April 1980; (2) Saudi Arabia - Crude Oil Capacity, Production, and Shut-in, March 1974-Apr 1980; (3) OPEC (Ex-Iran and Saudi Arabia) - Capacity, Production and Shut-in, June 1974-March 1980; (4) Non-OPEC Free World and US Production of Crude Oil, January 1973-February 1980; (5) Oil Stocks - Free World, US, Japan, and Europe (Landed, 1973-1st Quarter, 1980); (6) Petroleum Consumption by Industrial Countries, January 1973-December 1979; (7) USSR Crude Oil Production and Exports, January 1974-April 1980; and (8) Free World and US Nuclear Generation Capacity, January 1973-March 1980. Similar statistical tables and graphs included for the United States include: (1) Imports of Crude Oil and Products, January 1973-April 1980; (2) Landed Cost of Saudi Oil in Current and 1974 Dollars, April 1974-January 1980; (3) US Trade in Coal, January 1973-March 1980; (4) Summary of US Merchandise Trade, 1976-March 1980; and (5) US Energy/GNP Ratio, 1947 to 1979. (ERA citation 05:029189)

DOE/METC/12594-12 PC **A23**/MF **A01**
Kentucky Univ., Lexington.
Eastern Gas Shales Bibliography Selected Annotations: Gas, Oil, Uranium, Etc. Citations in Bituminous Shales Worldwide.
V. S. Hall. Jun 80, 540p
Contract AP21-79MC12594

This bibliography contains 2702 citations, most of which are annotated. They are arranged by author in numerical order with a geographical index following the listing. The work is international in scope and covers the early geological literature, continuing through 1979 with a few 1980 citations in Addendum II. Addendum I contains a listing of the reports, well logs and symposiums of the Unconventional Gas Recovery Program (UGR) through August 1979. There is an author-subject index for these publications following the listing. The second part of Addendum I is a listing of the UGR maps which also has a subject-author index following the map listing. Addendum II includes several important new titles on the Devonian shale as well as a few older citations which were not found until after the bibliography had been numbered and essentially completed. A geographic index for these citations follows this listing. (ERA citation 05:030204)

DOE/NASA/TM-78286 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
ASHMET: A Computer Code for Estimating Insolation Incident on Tilted Surfaces.
R. F. Elkin, and R. G. Toelle. May 80, 44p
Contract AI01-76CS31037

A computer code, ASHMET, has been developed by MSFC to estimate the amount of solar insolation incident on the surfaces of solar collectors. Both tracking and fixed-position collectors have been included. Climatological data for 248 US locations are built into the code. This report describes the methodology of the code, and its input and output. The basic methodology used by ASHMET is the ASHRAE clear-day insolation relationships modified by a clearness index derived from SOLMET-measured solar radiation data to a horizontal surface. (ERA citation 05:030367)

DOE/NASA/1034-8 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Thermal Energy Storage. Annual Report, January 1979-March 1980.
1980, 78p NASA-TM-81514
Contract AI01-77ET26945

The DOE Division of Energy Storage Systems (DOE/STOR) is responsible for formulating and managing research and development in energy storage technology. Major responsibility for project management in selected areas has been shifted to the DOE national laboratories and other government agencies. NASA Lewis Research Center (LeRC) was given the primary responsibility for the development of high-temperature sensible and latent heat storage technology via Interagency Agreement EC-77-A31-1034. This report describes not only the planning/implementation of activities associated with an acting lead center management role but also the technical accomplishments pertaining to high temperature thermal energy storage subsystems. Major elements reported are: 1.0 Program Definition and Assessment, 2.0 Research and Technology Development, 3.0 Industrial Storage Applications, 4.0 Solar Thermal Power Storage Applications, and 5.0 Building Heating and Cooling Applications. (ERA citation 05:029160)

DOE/PE-0020 PC **A08**/MF **A01**
Department of Energy, Washington, DC. Office of Policy and Evaluation.
Low Energy Futures for the United States.
Jun 80, 152p

A range of available technologies and public policies which can reduce future US primary energy consumption to below current levels while contributing to continued improvements in the standard of living is explored. These recent analyses of low energy futures are difficult to compare because of differences in basic assumptions, methods of analysis, time frames, and definitions of economic sectors. Ten representative studies in three major end-use sectors are analyzed and compared, with emphasis on areas where consensus emerges or where uncertainty remains: buildings (thermal and electrical control systems; structural changes; and appliance and space-conditioning efficiencies); industry (waste heat recuperation; cogeneration of heat and electricity; electric motor drive; and materials recycling); and transportation (automobiles,

light trucks, and vans; other passenger modes; and freight transportation). 56 references, 7 figures, 44 tables, 10 appendices. (ERA citation 05:030762)

DOE/RA/20005-1 PC **A06**/MF **A01**
Berger Associates, Inc., Harrisburg, PA.
Inventory of Federally-Funded Projects and Programs Related to Anthracite.
Jun 80, 101p
Contract AC01-79RA-20005

This report is a compilation of descriptions of federal projects and programs that are concerned in some way with anthracite. It is the first inventory of its type to be prepared. Among the projects and programs described are those completed in the latter half of 1979, those that are currently active, and others that will start soon. Of the 43 projects described, 8 involve research, development, and demonstration (RD and D) of technologies aimed at enhancing the use of anthracite or anthracite mining waste; 6 address environmental problems associated with anthracite mining or use; 9 provide information on the anthracite industry; 16 involve studies related to anthracite; and 4 are miscellaneous projects and programs. These projects and programs represent federal government expenditures of $27.1 million, excluding current military purchases of anthracite for use in European bases of $33.6 million, and US Bureau of Mines mined land demonstration and reclamation projects of $38.3 million. (ERA citation 05:030050)

DOE/TIC-10234 PC **A06**/MF **A01**
Montana Dept. of Natural Resources and Conservation, Helena.
Montana Renewable Energy Viability Project: Design Report.
Sep 79, 109p
Contract FG01-78CS69046

In the Montana Renewable Eergy Viability (REV) Project, the potential of energy sources and energy conservation will be examined for use throughout the state of Montana. Building on the substantial commitment of national, state, and private research dollars toward renewable forms of energy, the project will: assemble pertinent technical information relevant to Montana; assess the technical opportunities in terms of social, economic, and environmental effects; and identify and examine particular state and local actions that might influence the rate and type of sustainable energy development. The REV Project is designed to facilitate the implementation of existing state energy policies and builds upon existing research and planning experiences. It will both draw upon and contribute to state energy programs in the areas of energy conservation, renewable energy sources, and general energy planning. Its task is to develop information in a framework which will permit conventional and renewable alternatives to be compared, using the same criteria. The project will focus on the intermediate future, from the present to five to twenty years ahead. (ERA citation 05:029206)

EPRI-EA-1360 PC **A10**/MF **A01**
ICF, Inc., Washington, DC.
Revised Coal Resource Estimates: Four Case Studies. Final Report.
D. E. Klein. Mar 80, 212p

This report presents analyses undertaken to revise coal resource estimates for modeling purposes. The areas covered herein are Illinois, Texas lignite, Alaska, and Campbell County in Wyoming. In ICF's Coal and Electric Utilities Model (CEUM), the coal supply curves are developed as a function of coal reserves and mine-costing algorithms. The slope and length of the coal supply curves depend upon the coal reserve data and the assumptions used to allocate the reserves across mine-types. In CEUM, the source of the coal reserve data is the Bureau of Mines Demonstrated Reserve Base (DRB). The DRB is generally considered to be the most comprehensive set of coal reserves data available which covers the entire US. However, it has some distinct characteristics and weaknesses which limit its usefulness for modeling and forecasting. As a response to these actual or potential weaknesses in the DRB, this study seeks to improve upon the coal resource estimates used in our modeling work. Here we are seeking to refine the shapes of the coal supply curves as well as extend them to include less economic resources. In refining the shapes of the coal supply curves, the emphasis is on non-tonnage information; e.g., overburden ratios, seam thickness, coal quality, etc. In extending the coal supply curves, the emphasis is on incorporating less desirable and/or certain resources which are not included in the DRB. Illinois, Texas lignite, Alaska, and Campbell County in Wyoming were selected as the initial areas for analysis for several reasons. Each area has large coal resources, and future production from these regions is highly sensitive to several factors. Production from these regions also has a major impact on the production from other regions. Finally, for each area, additional information is known to be available, and which could substantially improve the accuracy and/or completeness of the DRB estimates. (ERA citation 05:030145)

EPRI-EA-1375 PC **A08**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Modeling Plant Location Patterns: Applications. Final Report.
T. W. Eagles, J. L. Cohon, and C. ReVelle. Feb 80, 171p

The locations of future energy facilities must be specified in order to assess the environmental impact of those facilities. Since major energy-facility construction is planned within a horizon generally less than 10 years in the future and energy/environment studies often cover periods of 25 years and beyond, a method was needed for predicting probable energy-facility locations beyond 10 years ahead. In response to this need, a computer model was developed which generates probable locations for hypothetical energy facilities. The model (limited currently to nuclear- and coal-fired electric-generating plants) is designed to cover a very large geographical region and locates facilities to the county level. The regional demand for additional baseload generating capacity associated with a postulated demand growth rate over any desired time horizon is specified by the user as input to the model. The user also specifies the part of this capacity which will be nuclear and which will be coal-fired. The model uses linear programming to distribute this specified generating capacity to the most probable locations within the region, based on physical factors. Political factors and matters of judgment also contribute to the location process. The model has been applied to two six-State regions. The mid-Atlantic region, consisting of Delaware, Maryland, New Jersey, Pennsylvania, Virginia, West Virginia and the District of Columbia, was used for model development and initial application. The Pacific Northwest region, consisting of Washington, Oregon, Idaho, Utah, Montana, and Wyoming, was the site of a second application to prove the generality of the model. In both regions, the year 2000 was chosen as the time horizon, and scenarios were run which embodied capacity growth rates of 3 to 7% over the time period 1978-2000. (ERA citation 05:029203)

EPRI-WS-78-114 PC **A06**/MF **A01**
Failure Analysis Associates, Palo Alto, CA.
Low-Pressure Steam Turbine Blade Failures. Workshop Proceedings, Detroit, Michigan, June 28-29, 1978.
Jul 80, 113p

Failures of blades in the low-pressure sections of steam turbines is costing the utility industry at least 265 million dollars/y. For this reason, a workshop was held to provide a forum for the exchange of information among utilities about blade failures and to recommend research and development to ensure increased blade life. Utility concerns involving circumstances of blade failures, corrective actions, inspection, reliability, blade replacement, and independent research were discussed. Current EPRI-sponsored R and D projects related to steam turbines were also described. The two most important themes that emerged were the desire for improved interutility communications about blade failures and the necessity for better solutions to blading problems. These issues are reflected in the following principal recommendations of the working group sessions: regularly scheduled workshops; a news bulletin and reporting system for improved information exchange about turbine failures; improved inspection procedures and requirements; standardization of blade design; better understanding of environment-material interactions; and in situ corrective actions for existing blades. The individual presentations, the ensuing discussions, and the recommendations of the three working groups are summarized. (ERA citation 05:030599)

EUR-5911 PC **A09**/MF **A01**
Commission of the European Communities, Luxembourg.
Comparison and Coordination of National Policies and Programmes in the Energy Research and Development Sector.
1978, 184p
U.S. Sales Only.

Inventory of programmes and expenditures in the field of energy research and development, which are financed from the public sector funds of the Member States and of the European Communities. (Atomindex citation 10:427478)

EUR-6739-EN PC **A11**/MF **A01**
Faculte Polytechnique de Mons (Belgium). Centre de Recherches sur l'Energie Solaire.
Solar Energy and Low Level Cyclic Energy Flow (20 to 100 exp 0 C) Storage as Chemical Bond Energy of Compounds Undergoing Thermal Decomposition. Final Report.
J. Bougard, P. Capron, and R. Jadot. 1980, 238p
U.S. Sales Only.

Various materials and reactions are studied for thermochemical heat storage at low temperatures for application in solar annual energy storage. Thermochemical reactions with water vapor were studied including selected hydrates and some adsorbents and molecular sieves. Silica gels are studied in detail including physical properties and the basic principles of the reversible adsorption phenomenon. Thermochemical heat storage based on reactions with ammonia are considered, and the discontinuous heat pump is discussed. (ERA citation 05:030542)

EUR-6760-EN PC **A06**/MF **A01**
Louvain Univ. (Belgium).
Decomposition of Multi-Regional Energy-Flow-Optimization Models. Final Report.
1979, 101p

A major component of the energy models elaborated under the auspices of the EEC authorities is an energy flow optimization model (EFOM). This optimization model turns out to be a large-scale linear-programming (LP) problem. A rather complex software package is being developed to generate and maintain the model data base, to generate the LP problem data and to exploit the results of the optimization. In particular it was decided to investigate procedures that would ease the numerical treatment of the large-scale LP problems arising in energy models. Section II of the present work is devoted to the theoretical aspects of the decomposition principle and of the decomposition algorithm. Sections III and IV deal, respectively, with implementation aspects and refinements of the decomposition algorithm; neither topic is extensively covered in the literature. Computational experience with an experimental FORTRAN code is reported in section V. Section VI proposed a dual-decomposition approach for a class of multi-regional production/distribution optimization systems as exemplified by the EEC multinational energy-flow-optimization model. Finally, in section VII, conclusions are drawn of this work and current and future work with an implementation of the decomposition algorithm are discussed, based on a modular commercial LP code. (ERA citation 05:029204)

FE-3167-T4 PC **A06**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Investigation of the Devolatilization of Coal under Combustion Conditions. Fourth Quarterly Report, July 1-September 30, 1979.
P. R. Solomon. Oct 79, 103p
Contract ET-78-C-01-3167

This report describes progress in a study of pyrolysis of coal under combustion conditions. Major accomplishments have been thermal decomposition

measurements on a number of additional coals, prediction of yields for vacuum pyrolysis, liquefaction with tetralin and hydropyrolysis, further developments of the pyrolysis model to allow prediction of pyrolysis under proximate analysis conditions, the further development of infrared techniques for characterizing functional groups in coals, improvements in the pyrolysis model permitting the simulation of non-isothermal conditions, characterization and comparison of processed and unprocessed coals and design and construction of a new pyrolysis apparatus. The new apparatus will permit experiments with reactive atmospheres and in situ, time resolved measurement of products. (ERA citation 05:030121)

GA-A-15580 PC **A99**/MF **A01**
General Atomic Co., San Diego, CA.
Line Focus Solar Central Power Systems. Phase I. Final Report, September 30, 1978-October 31, 1979.
Sep 79, 680p
Contract ET-78-C-03-2240

A conceptual design study was performed of a stand-alone Line Focus Solar Central Power System based on the fixed mirror solar concentrator (FMSC) for heat collection and draw salt (a 50% molar mixture of sodium nitrate and potassium nitrate) for heat transport and storage. Parametric analyses were performed at the subsystem level, and models were developed that were employed in a computerized simulation to minimize the cost of electricity (COE) by adjusting system design parameters. A design was prepared and costed for a first commercial plant with a rating of 100 MW(e) and a storage capacity equivalent to 420 MW(e)-hr of generation. The resulting plant achieves an annual capacity of 45.6%. Scaling studies indicate reductions in the COE for increased capacity factor and increased plant rating. Assessments of the plant concept indicate it should be acceptable to utilities on the basis of technical and operational considerations, but that reductions from the first 100-MW(e) plant cost would be required to achieve substantial market penetration. (ERA citation 05:030457)

INIS-mf-4609 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Royal Order of 12 December 1975 Setting Up a National Energy Committee.
1978, 4p
In French, Flemish.
U.S. Sales Only.

The National Energy Committee was set up by Royal Order of 12 December 1975. Its duties are to advise on the general objectives of energy policy and its implementation. It supervises execution of the policy and makes recommendations on matters within its competence. The Committee is chaired by the Minister for Economic Affairs and Energy and is composed of representatives of the Government, trade unions, undertakings, consumers, gas and electricity committees, oil and coal industries and a delegate of the Planning Department. This Order repeals the Order of 17 July 1957 creating an Energy Advisory Council. (Atomindex citation 10:421670)

INIS-mf-4610 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Royal Order of 23 November 1977 Amending the Royal Order of 12 December 1975 Setting Up a National Energy Committee.
1978, 2p
In French and Flemish.
U.S. Sales Only.

Royal Order of 23 November 1977 modified the composition of the National Energy Committee. Members of delegations are appointed by the Minister for Economic Affairs for a 5-year period which is renewable. The Secretariat includes members recognised for their technical, economic or social competence in the energy field. (Atomindex citation 10:421671)

INIS-mf-5332 PC **A06**/MF **A01**
Handelsministeriet, Copenhagen (Denmark).
Energy Report from The Ministry of Commerce, ER79.
1979, 118p
U.S. Sales Only.

According to Danish law the Ministry of Commerce should work out energy political reviews. The present report is such a review. The report contains evaluations of energy needs and energy supply possibilities, goals and plans in the energy area including energy research and development programmes. The statement of objectives formulated in the report"Danish Energy Policy1976" is reviewed and an estimate is made regarding the implementation of the plan. (Atomindex citation 10:495237)

LBL-10270 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Expertise Based Energy Information System.
S. Rosenberg. Apr 80, 12p CONF-800529-2
Contract W-7405-ENG-48
American Society for Information Service mid-year meeting, Pittsburgh, PA, USA, 15 May 1980.

An intelligent decision support system for energy information is described. The system draws on Artificial Intelligence technology, both in the design of the reasoning and representation components, and in the computer language. The computer language supports a powerful declarative semantics based on frame hierarchies. The design supports desirable user features such as substitution for incomplete data, data validation, caveat warnings, and simple noticing. A model of oil flow in the United States forms the semantic basis for the system. A reasoning component operating within this representation provides answers to queries; a capacity for analyzing energy scenarios; and complex monitoring of the database for developing trends. (ERA citation 05:026834)

LBL-10501 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Implications of International Comparisons of Energy Use: The Swedish/American Case Reviewed.
L. Schipper. Feb 80, 43p CONF-800241-1
Contract W-7405-ENG-48
Workshop on contemporary Scandinavian-American issues, Minneapolis, MN, USA, 29 Feb 1980.

The comparison of Swedish and US energy use is reviewed. It is seen that more efficient energy use in Sweden accounts for much of the difference in overall energy use observed. Some historical policies are discussed, particularly differences in energy pricing. The record since 1973 is reviewed, and signs of conservation in both countries are found. Some specific areas, such as tight houses, district heating, and lifestyle are reviewed; both countries offer lessons in conservation. Finally, a comparison of some key policy elements is offered. (ERA citation 05:027304)

LBL-10536 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Energy Demand and Conservation in Kenya: Initial Appraisal.
L. Schipper. Mar 80, 29p CONF-800384-1
Contract W-7405-ENG-48
Electric Power Research Institute workshop on energy and the developing nations, Stanford, CA, USA, 19 Mar 1980.

Ongoing research into the use and conservation of energy in Kenya is reported briefly. A partial accounting of energy use in Kenya is presented, and evidence that some energy conservation has been taking place is discussed. A fuller accounting for all commercial energy flows is both possible and desirable. The work presented should serve as a basis for further data collection and analysis in Kenya, and can be used as a model for similar efforts in other countries. The author intends to continue much of this energy accounting in Kenya in the latter half of 1980. (ERA citation 05:029184)

LBL-10896 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
International Comparison of Residential Gas Use and Conservation.
L. Schipper, and A. Ketoff. Jun 80, 21p CONF-800642-3
Contract W-7405-ENG-48
International gas research conference, Chicago, IL, USA, 9 Jun 1980.

A detailed study of the use of gas in households in several countries has compiled much data on the use of gas. The present discussion focuses on the factors that influence quantities of gas used, such as economic and lifestyle indicators, ownership of equipment, energy intensity of equipment use, gas prices, and conservation potentials. Detailed comparisons of gas use among countries over time are possible. It is suggested that a great potential for more efficient use of gas exists. (ERA citation 05:027266)

LBL-10960 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
International Residential Energy Use and Conservation Analysis: Structural and Economic Data Base.
L. Schipper. May 80, 75p
Contract W-7405-ENG-48

Compilations on demographic, economic, and housing data for Canada, France, Federal Republic of Germany, Italy, Japan, Sweden, and the United Kingdom are presented. Demographic and economic data covering population, personal disposable income, expenditures, and employment status are given for the years 1960 to 1978. The housing stock data for each country contains information on housing stock totals (additions, size, retirements); single family dwellings total; multifamily dwelling totals; and the residual total. Explanations are given for the derivation of the totals. (ERA citation 05:029239)

NP-24436 PC **A03**/MF **A01**
Kansas Energy Office, Topeka.
Energy Research and Resource Development in Kansas, FY 79.
Feb 80, 44p

In FY 79 about 2 million dollars was spent on energy research and resource development; of the total, 51% was Federally funded, 39% was state funded, and the rest was funded through other resources. Most of the research was done at three institutions: Kansas State University, University of Kansas, and the Kansas Geological Survey. These institutions represent 92% of the total energy research funds. Nonrenewable energy research accounted for 56% of all funds. Renewable accounted for 12% and conservation accounted for 27%. The remaining 5% was for a project to forecast energy demand and supply, which was more or less in its own category. Eighty-two percent of state funds were dedicated to nonrenewable research, with the rest split between renewable and conservation. In contrast, Federal monies showed more balance. Nonrenewable research accounted for 40%, renewable 12%, conservation 38% and unclassified the remaining 10%. Private-sector funds (foundations, not-for-profit agencies, corporations, etc.) were distributed along similar proportions as Federal funds. In sum, energy research and resource development in Kansas in fiscal year 1979 was modest. While the nonrenewable energy resources were well represented, efforts were very limited in solar, wind, and biomass alternate energy strategies. Conservation research, while faring better than renewable research, was nonetheless also small. (ERA citation 05:029178)

NRL-MR-4267 PC **A06**/MF **A01**
Naval Research Lab., Washington, DC.
Energy Storage as Heat-of-Fusion in Containerized Salts: Report on Energy Storage Boiler Tank.
T. A. Chubb, J. J. Nemecek, and D. E. Simmons.
27 Jun 80, 110p
Contract AI01-76ET20191

Energy storage based on heat-of-fusion in containerized salt is discussed. The energy storage boiler tank uses evaporation and condensation of a heat transfer fluid to provide heat transfer into and out of stacked cans of salt. The energy storage superheater tank uses a network of alkali metal heat pipes to distribute heat throughout a building filled with salt cans. It uses radiation to transfer energy to and from stacked cans of salt. The rationale for energy storage in containerized salt, salt selection, salt availability, salt processing, container require-

ments, can technology and heat transfer fluid degradation problems are discussed. These discussions lead to estimates of energy storage system costs. The Naval Research Laboratory is building a 2 MWht proof-of-concept energy storage boiler tank. Laboratory investigations studying the compatibility of the heat transfer fluid with the molten storage salt are described, along with measurements of temperature drops associated with the energy input process. An assessment of the current status of the energy storage boiler tank is presented. (ERA citation 05:030728)

N80-29844/1 PC **A02/MF A01**
National Aeronautical Lab., Bangalore (India).
A Horizontal Axis Sail Windmill for Use in Irrigation.
S. K. Tewari, Mar 79, 22p NAL-TN-54

Some basic considerations in the design and development of a horizontal axis windmill, intended primarily for irrigation in small farms from shallow open wells are described. This windmill has six triangular sails sweeping a circle of 10 meters in diameter, and is an adaptation from Greek sail windmills. For the construction of this windmill, all efforts are made to use materials and parts readily available in the hardware market except for the gear boxes. The cost of material and parts is approximately $900 which excludes cost of machining and fabrication charges. Preliminary performance tests indiate a pumping rate of 6000 to 11,000 liters/hour over a head of 6.85 meters in wind speeds of 10 to 16 km/hr.

N80-29861/5 PC **A03/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Intergenerational Equity and Conservation.
R. P. Otoole, and A. L. Walton. 15 Jun 80, 28p
NASA-CR-163434, JPL-PUB-80-49

The issue of intergenerational equity in the use of natural resources is discussed in the context of coal mining conversion. An attempt to determine if there is a clear-cut benefit to future generations in setting minimum coal extraction efficiency standards in mining is made. It is demonstrated that preserving fossil fuels beyond the economically efficient level is not necessarily beneficial to future generations even in terms of their own preferences. Setting fossil fuel conservation targets for intermediate products (i.e. energy) may increase the quantities of fossil fuels available to future generations and hence lower the costs, but there may be serious disadvantages to future generations as well. The use of relatively inexpensive fossil fuels in this generation may result in more infrastructure development and more knowledge production available to future generations. The value of fossil fuels versus these other endowments in the future depends on many factors which cannot possibly be evaluated at present. Since there is no idea of whether future generations are being helped or harmed, it is recommended that integenerational equity not be used as a factor in setting coal mine extraction efficiency standards, or in establishing requirements.

N80-29906/8 PC **A06/MF A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Development of High Temperature Resistant, Solar Absorber Surfaces.
Final Report.
W. Scherber, and G. Dietrich. Dec 79, 113p
BMFT-FB-T-79-70, ISSN-0340-7608
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Preparation techniques for selective coatings on high temperature solar collectors and their economic use were investigated by reproducing and improving known methods as well as developing alternative types of selective coatings. All samples were evaluated applying uniform criteria. The transfer of laboratory results to large area deposition is demonstrated to be feasible for a coating suitable for absorber temperatures up to 400 C. In-service results for prototypes of selective coated central receiver tubes produced and installed in a 10 kW solar power station in Cairo, Egypt are discussed.

ORNL/Sub-7585/1 PC **A06/MF A01**
Delaware Univ., Newark. Inst. of Energy Conversion.
Life and Stability Testing of Packaged Low-Cost Energy Storage Materials.
G. R. Frysinger. Jul 80, 120p
Contract W-7405-ENG-26

A low-cost laminated plastic film which is used to contain a Glauber's salt-based phase change thermal energy storage material in sausage-like containers called Chubs is discussed. The results of tests performed on the Chub packages themselves and on the thermal energy storage capacity of the packaged phase change material are described. From the test results, a set of specifications have been drawn up for a film material which will satisfactorily contain the phase change material under anticipated operating conditions. Calorimetric testing of the phase change material with thermal cycling indicates that a design capacity of 45 to 50 Btu/lb for a delta T of 30 exp 0 F can be used for the packaged material. (ERA citation 05:030729)

ORNL/TM-7022 PC **A04/MF A01**
Oak Ridge National Lab., TN.
Comparison of Solar-Thermal and Fossil Total-Energy Systems for Selected Industrial Applications.
G. D. Pine. Jun 80, 75p
Contract W-7405-ENG-26

Economic analyses of a conventional system (grid-electric-package-boiler) and total-energy systems based on phosphoric acid fuel cells, diesel-piston engines, and central-receiver-solar-thermal systems were performed for each of four industrial applications: a concrete block plant in Arizona, a fluid milk processing plant in California, a sugar beet processing plant in Colorado, and a meat-packing plant in Texas. The industrial application data were based on existing facilities, and reference case analyses were for a single plant size for each industry. However, scaled loads were used to explore the effects of system size on the relative economics of the four systems. All total-energy systems were assumed to be isolated from the electrical grid, but fossil-fueled boilers were assumed to provide thermal backup for solar collectors during prolonged periods of low insolation. Insolation data and fuel price projections appropriate to the plant locations were used to develop system cost and performance information. All systems were assumed to operate between 1985 and 2015. A series of sensitivity analyses was performed to show the effects of variations in fuel price, system size, cost of capital, and system initial cost. Solar total-energy systems (STES) are more capital intensive than the other systems, and significant economies of scale are associated with the STES. If DOE solar system cost goals are met, STES can compete with the other systems for facilities with electrical demands greater than two or three megawatts, but STES are not competitive for smaller facilities. Significant energy resource savings, especially of oil and gas, resulted from STES implementation in the four industries. (ERA citation 05:027140)

ORNL/TM-7206 PC **A06/MF A01**
Oak Ridge National Lab., TN.
Program Plan for the AR and TD Fossil Energy Materials Program.
R. A. Bradley, and R. R. Judkins. Jul 80, 107p
Contract W-7405-ENG-36

This program plan for the Department of Energy Advanced Research and Technology Development Fossil Energy Materials Program discusses the background and technical issues relating to the need for research and development on the materials of construction for fossil energy systems. Current projects being sponsored by this program are identified and each project is discussed briefly. Finally, needed programs for each of the fossil energy technologies are discussed. The plan provides for program sponsors, managers, and participants descriptions of the planned research activities in the AR and TD Fossil Energy Materials Program. Summaries of current and recent activities in this program, along with levels of funding, are provided to indicate the emphasis of the program with respect to the developing technologies and perceived materials problems associated with these developing technologies. The identification of needed programs provides participants and potential participants with an indication of anticipated funded activities. The plan focuses the technology development effort of the program on appropriate objectives and will aid in implementing the program in accordance with guidance received from the Department of Energy. (ERA citation 05:030103)

PAT-APPL-6-078 758 PC **A03/MF A01**
Department of Energy, Washington, DC.
High Temperature Solar Energy Absorbing Surfaces.
Patent Application,
J. M. Schreyer, C. R. Schmitt, and L. A. Abbatiello. Filed 25 Sep 79, 25p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A solar collector having an improved coating is provided. The coating is a plasma-sprayed coating comprising a material having a melting point above 500 exp 0 C at which it is stable and selected from the group of boron carbide, boron nitride, metals and metal oxides, nitrides, carbides, borides, and silicates. The coatings preferably have a porosity of about 15 to 25% and a thickness of less than 200 micrometers. The coatings can be provided by plasma-spraying particles having a mean diameter of about 10 to 200 micrometers. (ERA citation 05:032057)

PATENT-4 192 583
Not available NTIS
Department of Energy, Washington, DC.
Solar Receiver Heliostat Reflector Having a Linear Drive and Position Information System.
Patent,
R. H. Horton. Filed 21 Oct 77, patented 11 Mar 80, 10p PAT-APPL-844 403
Supersedes PAT-APPL-844 403-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A heliostat for a solar receiver system comprises an improved drive and control system for the heliostat reflector assembly. The heliostat reflector assembly is controllably driven in a predetermined way by a light-weight drive system so as to be angularly adjustable in both elevation and azimuth to track the sun and efficiently continuously reflect the sun's rays to a focal zone, i.e., heat receiver, which forms part of a solar energy utilization system, such as a solar energy fueled electrical power generation system. The improved drive system includes linear stepping motors which comprise low weight, low cost, electronic pulse driven components. One embodiment comprises linear stepping motors controlled by a programmed, electronic microprocessor. Another embodiment comprises a tape driven system controlled by a position control magnetic tape. (ERA citation 05:031868)

PB80-218944 PC **A12/MF A01**
Winter (Steven) Associates, Inc., New York.
Residential Energy Consumption: Baseline Comparison of Single Family Detached Homes.
Final rept.,
Steven Winter, and Emanuel Levy. 1 Nov 79, 259p SWA-GRI/01-09/79, GRI-79/0005
Contract GRI-5011-341-0104

The study is divided into three phases; (1) determination of baseline residential quantification of the change in these consumption levels due to changes in current construction practices; and, (3) prediction of future residential consumption levels. A methodology was developed for conducting the study focusing on prototypical SFD housng types. Specific construction characteristics for these types in each of the three time periods were generated from industry data and from surveys of the major housing builders and manufacturers throughout the continental U.S. A typical plan for such housing type was developed and became a template upon which roof/ceiling, wall and floor/foundation construction were overlaid as time/climate dependent variables. Those construction variables which have evolved as a consequence of

technological advances, energy codes and standards, or heightened awareness of energy conservation techniques could thus be isolated.

PB80-219207 PC **A03**/MF **A01**
Illinois Inst. of Tech., Chicago. Dept. of Chemical Engineering.
Fluidization Using Non-Equilibrium Thermodynamics.
Annual rept.,
Yueh Liu, and Dimitri Gidaspow. Dec 79, 39p
GRI-79/0065
Contract GRI-5014-363-0137

The thermodynamic theory of fluidization was used to analyze two problems of interest in the design of coal gasifiers: (1) pneumatic transport of a mixture of two particle sizes and (2) solids mixing in a fluidized bed.

PB80-222755 PC **A03**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Overview of Research and Development Activities in Improved Industrial Gas Utilization.
Final rept.
Aug 78, 43p GRI-78/0002
Contract GRI-5010-380-0055

This report provided an overview of activities currently being conducted by industry and government to improve the utilization of natural gas by industry. The information presented is intended to assist GRI in guiding its own research activities and to provide an information base for ensuring that its programs are coordinated with the activities of industry and government.

PB80-224991 PC **A12**/MF **A01**
Charles River Associates, Inc., Boston, MA.
The Impact of Automotive Fuel Economy Standards on Competition in the Automotive Industry.
Final rept. Oct 77-Jul 80,
J. Hayden Boyd, and Robert E. Mellman. Jul 80, 259p CRA-391, DOT-HS-805 528
Contract DOT-HS-7-01786

This report analyzes market demand for automobile attributes, including those that are likely to be affected by fuel economy improvements, and presents estimates of dollar market valuations of key attributes. Market share effects of various assumed changes in car prices are analyzed in order to gain insight into competition among car models and the sensitivity of new car fleet average fuel economy to possible manufacturer or size-class-specific pricing strategies. Effects of gasoline price changes are also analyzed.

PB80-226111 PC **A02**/MF **A01**
Polytechnic Inst. of New York, Brooklyn. Transportation Training and Research Center.
The Energy Advantages of Public Transportation. Executive Summary,
William R. McShane, Arnold Bloch, and William Ihlo. Mar 80, 12p UMTA-NY-11-0021-80-1
See also PB80-226129.

This report addresses the total energy advantage of public transportation, considering both auto and transit energy consumption as well as residential energy consumption and residential mix. The relative modal efficiencies, spatial structure, and residential energy consumption are considered in some detail. The focus is on petroleum-based energy. Regional variations are noted.

PB80-226129 PC **A05**/MF **A01**
Polytechnic Inst. of New York, Brooklyn. Transportation Training and Research Center.
The Energy Advantages of Public Transportation,
William R. McShane, Arnold Bloch, and William Ihlo. Mar 80, 84p UMTA-NY-11-0021-80-2
See also PB80-226111.

This report addresses the total energy advantage of public transportation, considering both auto and transit energy consumption as well as residential energy consumption and residential mix. The relative modal efficiencies, spatial structure, and residential energy consumption are considered in some detail. The focus is on petroleum-based energy. Regional variations are noted.

PB80-226491 PC **A06**/MF **A01**
Ohio River Basin Commission, Cincinnati.
Synfuels in the Ohio River Basin. A Water Resources Assessment of Emerging Coal Technologies.
Final rept.
Jan 80, 102p
Sponsored in part by Water Resources Council, Washington, DC.

Among the potential uses of coal in the Ohio River Basin are coal conversions into pipeline or industrial gas (coal gasification) and liquid hydrocarbons (coal liquefaction). This report addresses the water resources implications of development of these emerging energy technologies in the Ohio River Basin.

PB80-813942 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Energy Concentrator Design and Operation. 1976-July, 1980 (Citations from the NTIS Data Base).
Rept. for 1976-Jul 80,
Audrey S. Hundemann. Sep 80, 270p
Supersedes NTIS/PS-79/0926, and NTIS/PS-78/0838.

Government-funded research on the design and operation of various types of solar energy concentrators is discussed. Abstracts cover the efficiency and optimization of Fresnel lenses, V-through concentrators, flat plate and parabolic reflectors, compound parabolic concentrators used in solar photovoltaic conversion, and heliostat systems. A few abstracts deal with heat loss and cost studies. (This updated bibliography contains 266 citations, 89 of which are new entries to the previous edition.)

PB80-856222 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Industrial Energy Management. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 152p NERACEDBNT0992
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the management of energy for energy conservation/energy efficiency in specific industries and in industry in general are contained in this retrospective bibliography. (Contains 129 citations.)

PB80-856511 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Solar Energy Bibliographies. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 89p NERACEDBNT0708
Sponsored in part by National Technical Information Service, Springfield, VA.

Solar energy bibliographies from various government, university, and private sources are contained in this retrospective bibliography. (Contains 087 citations.)

PB80-857436 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Geothermal Power. June, 1976-June, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-Jun 80,
Walter Van Put. Aug 80, 199p
NERACEDBNT0642
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the development, utilization, and analysis of geothermal power. Citations include descriptions of specific geothermal energy applications such as direct-heat and electrical uses, thermionic converters, power plant cooling systems, and reports on the environmental impacts of site-specific applications. (Contains 142 citations.)

PB80-858459 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Energy Conservation Technology. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 54p NERACEI NT0580
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information is cited on applications of energy conservation techniques. Design techniques and devices to conserve energy are also discussed. (Contains 035 citations.)

PB80-858467 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Energy Conservation Technology. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 214p
NERACEDBNT0580
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information is cited on applications of energy conservation techniques. Design techniques and devices to conserve energy are also discussed. (Contains 186 citations.)

PB80-859721 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Geothermal Power. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Aug 80, 228p
NERACUSGNT0642
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the development, utilization, and analysis of geothermal power. Citations include descriptions of specific geothermal energy applications such as direct-heat and electrical uses, thermionic converters, power plant cooling systems, and reports on the environmental impacts of site-specific applications. (Contains 120 citations.)

PB80-859739 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Geothermal Power. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Aug 80, 198p NERACEI NT0642
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the development, utilization, and analysis of geothermal power. Citations include descriptions of specific geothermal energy applications such as direct-heat and electrical uses, thermionic converters, power plant cooling systems, and reports on the environmental impacts of site-specific applications. (Contains 130 citations.)

PB80-860141 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Solar Energy Bibliographies. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 92p NERACUSGNT0708
Sponsored in part by National Technical Information Service, Springfield, VA.

This report contains a collection of bibliographies containing technical material on various topics in solar energy. (Contains 156 citations.)

PNL-RAP-39 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Potential Social, Institutional, and Environmental Impacts of Selected Energy-Conservation Measures in Two Washington Communities.
E. Edelson, and M. Olsen. Mar 80, 95p
Contract EY-76-C-06-1830

The likely environmental, social, and institutional impacts of selected energy-conservation measures in two communities in Washington state are

reported. The five conservation measures investigated in this study were: (1) retrofitting existing buildings; (2) district heating and Integrated Community Energy Systems (ICES); (3) small automobiles and vehicle redesign; (4) land-use and housing modifications; and (5) electric-utility rate reform. Twenty potential impact areas were selected for analysis. These areas were divided into five categories of environmental impacts, economic impacts, community impacts, personal impacts, and overall quality of life in the community. The research was conducted in Seattle and Yakima, Washington. In each location, about two dozen public officials and business, labor, and community leaders were interviewed. Their diverse views are summarized. The Seattle respondents saw energy conservation as a highly desirable policy with a number of temporary, transitional problems arising as energy-conservation measures were implemented. Yakima respondents, in contrast, did not expect to encounter many serious energy problems in the foreseeable future and consequently viewed energy conservation as a relatively minor community concern. Moreover, they anticipated that many conservation measures, if implemented by the government, would encounter either apathy or resistance in their community. Two broad generalizations can bedrawn from these interviews: (1) energy conservation will basically be beneficial for the natural environment and our society; and (2) if energy conservation does become a dominant thrust in our society, it could stimulate and reinforce a much broader process of fundamental social change. (ERA citation 05:027267)

PNL-3286 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Evaluation of Solar Mirror Figure by Moire Contouring.
J. W. Griffin, and M. A. Lind. Jun 80, 85p
Contract AC06-76RL01830

Moire topography is applied to the figure assessment of solar mirrors. The technique is demonstrated on component facets of a six-meter diameter, four-meter focal length, parabolic dish collector. The relative ease of experimental implementation and subsequent data analysis suggests distinct advantages over the more established laser ray trace or BCS/ICS technique for many applications. The theoretical and experimental considerations necessary to fully implement moire topography on mirror surfaces are detailed. A procedure to de-specularize the mirror is demonstrated which conserves the surface morphology without damaging the reflective surface. The moire fringe patterns observed for the actual mirror facets are compared with theoretical contours generated for representative dish facets using a computer simulation algorithm. A method for evaluating the figure error of the real facet is presented in which the error parameter takes the form of an average absolute deviation of the surface slope from theoretical. The experimental measurement system used for this study employs a 200 line/inch Ronchi transmission grating. The mirror surface is illuminated by a collimated beam at 60 exp 0 . The fringe observation is performed normal to the grating. These parameters yield contour intervals for the fringe patterns of 0.073 mm. The practical considerations for extending the techniques to higher resolution are discussed. (ERA citation 05:030533)

PNL-3408 PC **A06**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Preliminary Evaluation of Wind Energy Potential: Cook Inlet Area, Alaska.
T. R. Hiester. Jun 80, 103p
Contract AC06-76RL01830

This report summarizes work on a project performed under contract to the Alaska Power Administration (APA). The objective of this research was to make a preliminary assessment of the wind energy potential for interconnection with the Cook Inlet area electric power transmission and distribution systems, to identify the most likely candidate regions (25 to 100 square miles each) for energy potential, and to recommend a monitoring program sufficient to quantify the potential. (ERA citation 05:030593)

RLO-2227-T24-78-2 PC **A05**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Atmospheric Science.
Vegetation as an Indicator of High Wind Velocity. Wind Power Potential in the Pacific Northwest Coastal Region. Final Report, February 15, 1978-June 14, 1978.
E. W. Hewson, J. E. Wade, R. W. Baker, and R. C. Heald. Jun 78, 92p
Contract EY-76-S-06-2227-024

Methodologies for evaluating wind power potential over a regional area are described as are the analyses performed upon the data for the region defined as the Pacific Northwest Coastal Region (PNWCR). This region is composed of the area west of the Cascade Mountains in Washington and Oregon. The analyses utilize existing summarized data, vegetative indicators of wind velocity, and inferred windflow patterns over characteristic coastal region terrain forms. The results of the analyses indicate that there are significant year-to-year variations of mean wind speed, but the annual mean wind speed may be adequately characterized after a recording period of three years or more. (ERA citation 05:030594)

SAN-1176-T5 PC **A04**/MF **A01**
SRI International, Menlo Park, CA.
Fuel Conservation Opportunities Through Changes in Mode of Freight Transportation. Final Report.
R. M. Corbett, and A. E. Moon. Jun 79, 53p
Contract EY-76-C-03-1176

The study identifies opportunities for and barriers to increased use of railroads to promote fuel conservation. Transportation officials were interviewed from 9 companies in the processed food, metals, chemicals, and transportation vehicle industries. These industry personnel identified unreliable delivery times and equipment shortages as the key issues in their decision not to use the railroads. A range of actions that railroad management could take to improve transit time reliability is identified. Barriers to implementing changes include (in increasing order of difficulty) changes in operating practices, capital outlays, increased operating costs, and changes in work rules. Ranked by increased order of difficulty to implement actions to improve reliability are as follows: rationalize train schedules, yard crew assignments in terminal areas, system blocking plan, and configuration of complex terminal areas; schedule freight cars from door to door; and operate freight trains more frequently. (ERA citation 05:029252)

SAND-79-1483 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Realistic Approach to the Planning of High-Technology, High-Risk Projects.
M. J. Becktell. May 80, 14p
Contract AC04-76DP00789

The need for changes in philosophy and for a practical and realistic approach to the management plan used to support high-technology, high-risk projects, calls for bold, honest planning, and unbiased, objective guidance. (ERA citation 05:029179)

SAND-79-2190 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Solar Mirror Materials: Their Properties and Uses in Solar Concentrating Collectors.
R. B. Pettit, and E. P. Roth. Jun 80, 43p
Contract AC04-76DP00789

The current state of mirror materials with application to solar concentrators is reviewed. After specular reflectance is defined, the optical measurement techniques developed specifically for these materials are discussed. Next, the solar reflectance properties of mirror materials, divided into categories of glass, metallize plastics, polished aluminum, and protective coatings, are summarized. Finally, current problem areas and future areas of research are discussed. (ERA citation 05:030534)

SAND-79-2422 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Effect of Soiling on Solar Mirrors and Techniques Used to Maintain High Reflectivity.
E. P. Roth, and R. B. Pettit. Jun 80, 52p
Contract AC04-76DP00789

Solar mirrors are used to concentrate low-level solar radiation to power levels which are practical and efficient for consumption. Any interference with the collection of that energy not only decreases the power level but also increases the cost of the energy available from a solar power system. One of the most immediate and drastic effects of outdoor exposure is the reflectance loss due to the accumulation of foreign particles on the mirror surface. Specular reflectance losses as great as 25% have been observed for mirrors exposed for only a few weeks. The effect of the deposited particles is to reduce the reflected energy by both absorbing and scattering light. The degree to which the particles reduce the collection of reflected energy depends on their composition, number and size distribution. An additional factor is the optics of the collection system. The angular acceptance aperture of the system, defined as the angle subtended by the receiver at the concentrator surface, determines the relative importance of the scattering due to dust accumulation. For flat plate thermal and photovoltaic collectors which have essentially a 180 exp 0 angular acceptance aperture, scattering of the incident light is not critical but absorption can be an important factor in the loss of energy. For concentrating collection systems, such as line focus collectors and central receivers, angular acceptance apertures of a few degrees make scattering at the concentrator surface much more important and can result in severe energy losses. Results of a study of each of these areas are presented and discussed. (ERA citation 05:030535)

SAND-80-0702C PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Development of Sheet Molding Compound Solar Collectors with Molded-In Silvered Glass Reflective Surfaces.
R. L. Champion, and R. E. Allred. 1980, 42p
CONF-800686-1
Contract AC04-76DP00789
Society of Manufacturing Engineering Composites conference, Los Angeles, CA, USA, 10 Jun 1980.

An approach to the fabrication of a line-focusng parabolic trough reflector structure which offers the potential of high performance while utilizing mass production type technology with potential for low cost is discussed. The concept is one of a molded structure of fiber reinforced plastic with an integrally molded silvered glass reflective surface. Sheet molding compound (SMC), a mixture of glass fibers and inorganic fillers in polyester resin, has been selected for evaluation as representative of reinforced plastic molding materials. The purpose of the work was to establish the feasibility of molding glass mirrors into SMC structural trough panels. If the effort oroved successful, the next stage of development would be demonstration of the structure in a trough collector which incorporates individual SMC reflector panels. The trough has a 2 x 6 m aperture with six individual SMC panels mounted on a torque tube as the main support structure. Results are described. (ERA citation 05:030536)

SERI/SP-513-436 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Solar Energy Research Institute 1979 Annual Report.
1979, 19p
Contract AC02-77CH00178

A general description of the SERI organization, facilities, programs, and progress in 1979 is presented. (ERA citation 05:030364)

SERI/TP-632-645 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Line-Focus Sun Trackers.
R. Gee. May 80, 6p CONF-800604-31
Contract AC02-77CH00178
American section of the International Solar Energy Society conference, Phoenix, AZ, USA, 2 Jun 1980.

Sun trackers have been a troublesome component for line-focus concentrating collector systems. The problems have included poor accuracy, component failures, false locks on clouds, and restricted tracker operating ranges. In response to these tracking difficulties, a variety of improved sun trackers have been developed. A testing program is underway at SERI to determine the tracking accuracy of this new generation of sun trackers. The

three major types of trackers are defined, some recent sun tracker developments are described, and the testing that is underway is outlined. (ERA citation 05:030538)

SERI/TP-731-706 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Decision Analysis: A Tool to Guide the R and D Selection of Alternative Energy Sources.
T. Kriz. May 80, 8p CONF-800567-1
Contract AC02-77CH00178
International symposia alternative energy sources and technology, Montreal, Canada, 28 May 1980.

The array of alternative energy sources which are vying for the federal government's R and D dollar is formidable when compared to the politically acceptable amount which can be used to fund the research. To guide how these funds should be dispersed, a rational, defensible procedure is needed which can repeatedly be applied as new technologies and new information become available. The procedure advanced in this paper is a decision analysis technique known as multi attribute decision analysis (MADA) and its use is illustrated in an evaluation and ranking of solar thermal electric power generating systems. Since the ultimate purchase decision is made in the market place, the preferences of potential users have been sampled and brought to bear on the ranking. The focus of this description is on the formulation of the problem structure and the decision model, the treatment of uncertainty, and how the results relate to the questions asked by and of the Department of Energy, which funded the study. A final note proposes how decision analysis can be used to address the broader questions of choice among competing technologies with cautions concerning misuse of the procedure. (ERA citation 05:028653)

SERI/TP-733-665 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Reducing Fuel Usage Through Applications of Conservation and Solar Energy.
E. K. May, and D. W. Hooker. Apr 80, 13p
CONF-800706-3
Contract AC02-77CH00178
Western plant engineering conference, Anaheim, CA, USA, 15 Jul 1980.

Solar thermal technology, coupled with aggressive conservation measures, offers the prospect of greatly reducing the dependence of industry on oil and natural gas. The near-term market for solar technology is largely in industrial processes operating at temperatures below 288 exp 0 C (550 exp 0 F). Such process heat can be supplied by the relatively unsophisticated solar equipment available today. The number and diversity of industrial plants using process heat at this temperature allows favorable matches between solar technologies and industrial processes. The problems involved with the installation and maintenance of conservation and solar equipment are similar. Both compete for scarce investment capital, and each complicates industrial operations and increases maintenance requirements. Technological innovations requiring new types of equipment and reducing the temperature requirements of industrial processes favor the introduction of solar hardware. The industrial case studies program at the Solar Energy Research Institute has examined technical, economic, and other problems facing the near-term application of solar thermal technology to provide industrial process heat. The plant engineer is in the front line of any measure to reduce energy consumption or to supplement existing fuel supplies. The conditions most favorable to the integration of solar technology are presented and illustrated with examples from actual industrial plants. (ERA citation 05:030525)

SERI/TR-631-505 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Advanced Component Research Facility (ACRES).
M. Bohn. Jul 80, 36p
Contract AC02-77CH00178

A detailed description of the SERI Advanced Component Research Facility (ACRES) is given. Background information explicates the facility's history, developed around the two Omnium-G parabolic dish concentrators. The Omnium-G concentrators and electrical power plant are described. The purpose and a detailed descripttion of ACRES is also given. Included is a description of the measurement capabilities, the controls, and each component of the facility. (ERA citation 05:030458)

SERI/TR-631-647 PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Preliminary Screening of Thermal Storage Concepts for Water/Steam and Organic Fluid Solar Thermal Receiver Systems.
R. J. Copeland, M. E. Karpuk, and J. L. Ullman. Apr 80, 60p
Contract EG-77-C-01-4042

A preliminary comparison of thermal storage concepts for solar thermal applications was done generically for large and small solar systems with sensible and latent heat and two-stage storage concepts. Concepts were ranked based on the cost of delivered energy. A +- 20% uncertainty in subsystem cost was included in the analysis. Water/steam and organic fluid collector/receivers were studied separately. For the water/steam concept, Barstow technology (100 MW/sub e/) was examined. A nitrite/nitrate salt with a low-cost solid medium was best for buffer storage; for diurnal storage, the two-stage draw salt/low-cost media and oil/rock concept was best. Phase change concepts require improvements on the concept analyzed to be attractive. For the organic fluid system, a Shenandoah total energy system was examined. The Syltherm trickle charge taconite concept was the most favorable and may be improved by replacing the taconite with a lower-cost oil-compatible medium. Salt concepts can be competitive with this system only if there is a low-cost solid medium that is compatible with the salt and the end use requires a large amount of storage. The phase change concept examined was found to be quite poor for this total energy application. (ERA citation 05:030543)

SERI/TR-751-472 PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Solar Information User Priority Study.
W. W. Belew, and B. L. Wood. May 80, 74p
Contract EG-77-C-01-4042

This report identifies for each solar technology those members or potential members of the solar community who, either currently or in the future, will require solar information. In addition, it rates each user's relative need for information within the next three years. This information will be used as input for subsequent studies that will identify specific user needs information. These studies, in turn, will be the basis for information product and data base development for the Solar Energy Information Data Bank (SEIDB). In addition, they will be input for the Technical Information Dissemination (TID) Program. (ERA citation 05:030366)

UCID-18745 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Microcomputer Firmware Description, LGF Data Acquisition System.
J. Baker. 26 Jun 80, 19p
Contract W-7405-ENG-48

The firmware developed at LLL for the LLL Data Acquisition System for Liquefied Gaseous Fuels Program is described. Approximately 4000 lines of assembly language coding were developed; structured-macros and top-down structured programing design techniques were used. This coding executes from read-only-memory in 51 Complementary-Metal-Oxide Semiconductor (CMOS) battery-powered data acquisition systems. The systems are being deployed at NWC, China Lake for acquiring data during liquefied natural gas dispersion tests. 1 figure, 5 tables. (ERA citation 05:030202)

10B. Power Sources

AD-A088 031/0 PC **A03**/MF **A01**
Arnold Engineering Development Center Arnold Air Force Station TN
Heat Transfer and Static Stability Tests of the General Purpose Heat Source (GPHS) configurations at Mach 8.0.
Final rept.,
W. A. Crosby, and E. C. Knox. Jan 80, 32p Rept no. AEDC-TSR-80-V7
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Heat transfer and static stability tests were conducted in the VKF Tunnel B at Mach 8. Discrete point surface heat flux measurements were made on the reference (unmodified) GPSH configuration over a range of inclination angles from -50 to 140 deg at several model orientations. Six-component static force and moment measurements were made on the reference GPHS configuration and three design modifications. An angle-of-attack range of -5 to 95 deg was covered at angles of sideslip from -9 to 15 deg and aerodynamic roll angles from -45 to 45 deg. (Author)

AD-A088 333/0 PC **A05**/MF **A01**
Nebraska Univ.-Lincoln Dept of Mechanical Engineering
Pseudo-Shock as a Qualitative Model in the Investigation of the Influence of Wall Roughness on the Performance of Supersonic MHD Generators.
Final rept.,
Pau-Chang Lu. Jul 80, 93p UNLMEPCL-80-1, AFOSR-TR-80-0599
Grant AFOSR-79-0083

A preliminary study, based on an extension of Crocco's pseudo-shock model, has been carried out to explain and predict qualitatively the rather gradual pressure rise in a supersonic MHD generator, to account for the influence of wall roughness on the core flow. A system of non-linear ordinary differential equations is formulated for the wall layer and core, with proper electromagnetic conditions enforced at the interface. Extensive numerical experiments are also presented, which demonstrate indeed the qualitative link between the theory of MHD pseudo-shock and the observed pressure ramp caused by rough walls. (Author)

AD-A088 506/1 PC **A02**/MF **A01**
Texas Univ At Austin Dept of Chemistry
Semiconductor Electrodes 29. High Efficiency Photoelectrochemical Solar Cells with n-WSe2 Electrodes in an Aqueous Iodide Medium.
Technical rept. 1 Sep 79-31 Aug 80,
Fu-Ren F. Fan, Henry S. White, Bob Wheeler, and Allen J. Bard. 18 Dec 79, 11p Rept no. TR-8
Contract N00014-78-C-0592
Pub. in Jnl. of the Electrochemical Society, v127 n2 p518-520 Feb 80. See also AD-A088 504.

No abstract available.

ANL/AA-17 PC **A06**/MF **A01**
Argonne National Lab., IL.
Reliability, Energy, and Cost Effects of Wind-Powered Generation Integrated with a Conventional Generating System.
J. C. VanKuiken, W. A. Buehring, C. C. Huber, and K. A. Hub. Jan 80, 114p
Contract W-31-109-ENG-38

The purpose of this investigation is to examine the potential impacts of incorporating wind turbines, without the aid of energy-storage devices, into a conventional electrical generating system. This study focuses on the contribution to generating-system reliability of wind turbines, and the methods used to calculate these benefits. In addition, a simple cost model was developed to estimate ranges of breakeven costs for wind turbines based on the sum of fuel cost savings, variable operation and maintenance (0 and M) cost savings, and reliability benefits of the wind turbines. (ERA citation 05:030584)

ANL/CNSV-TM-32 PC **A03**/MF **A01**
National Economic Research Associates, Inc., Los Angeles, CA.
Assessment of Potential and Existing Problems Concerning Interface Between Electric Utilities and Cogenerators.
Mar 80, 39p
Contract W-31-109-ENG-38

The potential and existing problems concerning the interface between US electric utilities and co-

generators are considered by region. Also considered are regulatory barriers, rates and contracts, economic feasibility, and impact on system planning. Finally, the impact of the National Energy Act on the marketability potential of cogeneration is reviewed. The three appendixes summarize the utility meetings on cogeneration held in Washington, DC, Los Angeles, and Chicago. (ERA citation 05:029195)

ANL/ECT-7 PC **A18**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Gasification/Combined-Cycle Power Generation: Environmental Assessment of Alternative Systems.
Nov 78, 401p
Contract W-31-109-ENG-38

This report provides a basis for the comparative assessment of the potential performance capability, technological development, and economic and environmental impact associated with the operation of integrated low-Btu coal-gasification/combined-cycle power systems. Characterization of the integrated power system in terms of fuel processing, power production, and auxiliary systems is followed up with comparisons of alternative integrated-plant-design/fuel combinations with reference to the conventional coal-fired power plant, taking into account both economic and environmental factors. The report includes an assessment of the effects of recent regulatory changes on the prospects for integrated power systems and establishes a timetable for the probable commercial development of such systems by the utilities. (ERA citation 05:030135)

CONF-791204-39 PC **A03**/MF **A01**
Argonne National Lab., IL.
Assessment of the Atmospheric Effects of a Satellite Power System.
D. M. Rote, K. L. Brubaker, J. Lee, and A. R. Valentino. 1979, 30p
Contract W-31-109-ENG-38
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10 Dec 1979.

The satellite power system has been proposed as an alternative, renewable energy source for the early part of the next century. The present paper focuses on a pertinent reference system that has been the focal point of a Concept Development and Evaluation Program (CDEP). In addition, one aspect of the CDEP program, namely, the Atmospheric Effects Assessment, is detailed. Starting with the troposphere, potential atmospheric effects and the present understanding of them are summarized as a function of altitude. The main source of disturbance is described as the space transportation system, which would include a heavy lift launch vehicle (HLLV) approximately five times larger than the Saturn V rocket. To transport the necessary materials into space, HLLVs would have to be launched once or twice per day for thirty years. Essentially all levels of the atmosphere will be affected. However, as the altitude increases, the atmosphere becomes increasingly rarified, the possible degree of modification increases, and the state of our knowledge regarding such modifications decreases. Hence, the results presented here are, in most cases, only preliminary. (ERA citation 05:031121)

CONF-800324-3 PC **A02**/MF **A01**
Argonne National Lab., IL.
Molten Carbonate Fuel Cell Programs in the United States.
J. P. Ackerman. 1980, 17p
Contract W-31-109-ENG-38
Seminar on electrochemical systems: batteries and fuel cells, Fortaleza-Ceara, Brazil, 2 Mar 1980.

The environmental, performance, and economic aspects of molten carbonate fuel cell power plants are discussed. Design, components, and operation of molten carbonate fuel cells are discussed, and US research is outlined. (ERA citation 05:030789)

CONF-800633-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Experimental Studies of OTEC Heat Transfer Evaporation of Ammonia on Vertical Smooth and Fluted Tubes.
G. S. Mailen. 1980, 24p
Contract W-7405-ENG-26
Ocean energy conference, Washington, DC, USA, 2 Jun 1980.

Experiments were run to determine the heat transfer performance of single vertical tubes with ammonia evaporating from a thin falling film on the tube outside. The three aluminum tubes tested were of 2.54-cm (1.0-in.) nominal diameter and 1.22-m (4.0-ft) length; one with smooth internal and external surfaces, one with a smooth inside surface and 48 external flutes, and one with 34 internal and 42 external flutes. The composite evaporation heat transfer coefficients (coefficients that include the resistance of both the evaporating film and the tube wall), based on the total tube outside surface area, ranged from 2720 to 12,020 W/m exp 2 .K (480 to 2120 Btu/h.ft exp 2 . exp 0 F) over the heat load range of 690 to 3990 W (2360 to 13,620 Btu/h). Corresponding composite temperature differences ranged from 1.2 to 5.7 exp 0 K (2.2 to 10.2 exp 0 F). Reflux ratios, the ratio of the ammonia feed rate at the top of the tube to the average evaporation rate, ranged from 1.1 to 12.6 over the ammonia feed rate range of 3 x 10 exp -6 to 15.9 x 10 exp -6 m exp 3 /s (0.05 to 0.25 gpm). The data show that fluted tubes provide little or no enhancement of evaporation-side heat transfer coefficients when compared to evaporation coefficients obtained from a smooth tube. (ERA citation 05:030468)

CONF-800723-21 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Enhanced Condensation Heat Transfer.
J. W. Michel, and R. W. Murphy. 1980, 20p
Contract W-7405-ENG-26
19. national heat transfer conference, Orlando, FL, USA, 27 Jul 1980.

For the past four years, work has been in progress at ORNL to develop improved condensers for geothermal binary power cycles. The work has centered on optimizing the design variables associated with fluted surfaces on vertical tubes and comparing the tube performance with available enhanced tubes either for vertical or horizontal operation. Data with seven fluids including a hydrocarbon, fluorocarbons, and ammonia condensing on up to 30 different tubes have been obtained. Data for tubes of different effective lengths (1/2 to 4 ft) and inclination have also been obtained. The primary conclusion from this work is that the best fluted tubes can provide an enhancement in condensation coefficient by a factor of approximately 6 over smooth vertical tube performance and a factor of approximately 2 over the best enhanced commercial tubes either operating vertically or horizontally. These data, together with field test data have formed the basis for designing two prototype condensers, one for the 60 kWe Raft River, Idaho, pilot plant and one for the 500 kWe East Mesa, California, direct-contact demonstration plant. (ERA citation 05:030573)

COO-27242-2 PC **A02**/MF **A01**
Technecon Analytic Research, Inc., Philadelphia, PA.
Effect of Proposed Federal Tax Credits and Forgivable Loans on Geothermal Electric Power Development: Hot Line Report.
T. A. V. Cassel. Nov 79, 10p
Contract AC02-79ET27242

The likely impacts of two proposed federal incentives for accelerating the development of geothermal resources for electric power production are evaluated. The incentives are: an additional 20% investment tax credit applicable to both well field capital and power plant capital; and a federal loan for 50% of the cost of exploration and confirmation wells which is entirely forgivable if the wells prove unsuccessful. The evaluations were performed by the use of DOE's geothermal investment decision model (TCN2000), which is presently capable of estimating the probability of progressive levels of development at ten Known Geothermal Resource Areas (KGRA's) in California and Utah. (ERA citation 05:028868)

COO-4094-83 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Materials, Processes and Testing Laboratory. Technical Progress Report: July, August, September, October 1979.
S. E. Forman, and M. P. Themelis. 15 Mar 80, 56p
Contract AC02-76ET20279

The US Department of Energy has set a 20-year lifetime goal for terrestrial photovoltaic modules. In its capacity as a Photovoltaic Field Test and Application Center, Massachusetts Institute of Technology Lincoln Laboratory has established various experimental test sites, ranging in size from 0.1 to 25 kW of peak power, throughout the United States. These sites contain modules from several manufacturers and serve as test beds for photovoltaic system components. This report, the sixth in a series of similar reports, summarizes the activities of the Materials, Processes and Testing Laboratory of the Solar Photovoltaic Field Tests and Applications Project during the four-month period, 1 July 1979 through 31 October 1979. During this period, field inspections of test sites at Bryan, Ohio, and Mead, Nebraska, were conducted and are reviewed. An inordinate module failure rate at the University of Texas at Arlington is reviewed and analyzed. Failures and degradation of Mead, Nebraska, modules are analyzed, and the development of testing equipment for PV systems is discussed. (ERA citation 05:030417)

DOE/CS/05313-1 PC **A17**/MF **A01**
BDM Corp., Albuquerque, NM.
Commercial Application of a Photovoltaic Concentrator System. Phase I. Final Report, 1 June 1978-28 February 1979.
D. J. Anderson, E. R. Anderson, and K. M. Bardwell. Apr 80, 384p
Contract ET-78-C-04-5313

This report documents the design and analysis of the BDM CAPVC (Commercial Application of a Photovoltaic Concentrator) system. The preliminary design, prototype test and evaluation, system analysis, and final design of a large-scale concentrating photovoltaic system are described. The application is on an attractive new office building which represents a large potential market. The photovoltaic concentrating array is a roof-mounted, single-axis linear parabolic trough, using single crystalline silicon photovoltaic cells. A total of 6720 square feet of aperture is focussed on 13,944 PV cells. The photovoltaic system operates in parallel with the local utility in an augmentary loadsharing operating mode. The array is actively cooled and the thermal energy utilized for building heat during winter months. (ERA citation 05:030418)

DOE/CS/21036-01 PC **A08**/MF **A01**
Aerospace Corp., El Segundo, CA.
Solar Thermal Power Systems. Summary Report.
Jun 80, 153p
Contract AI01-79ET21036

The work accomplished by the Aerospace Corporation from April 1973 through November 1979 in the mission analysis of solar thermal power systems is summarized. Sponsorship of this effort was initiated by the National Science Foundation, continued by the Energy Research and Development Administration, and most recently directed by the United States Department of Energy, Division of Solar Thermal Systems. Major findings and conclusions are sumarized for large power systems, small power systems, solar total energy systems, and solar irrigation systems, as well as special studies in the areas of energy storage, industrial process heat, and solar fuels and chemicals. The various data bases and computer programs utilized in these studies are described, and tables are provided listing financial and solar cost assumptions for each study. An extensive bibliography is included to facilitate review of specific study results and methodology. (ERA citation 05:030427)

DOE/DP/03533-T2 PC **A04**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Financial Problems Facing the Manufacturers of Small Wind Energy Conversion Systems. Final Report.
T. G. Bolie. Nov 79, 66p

Contract AC04-76DP03533

The financial barriers faced by the manufacturers of small wind energy conversion systems (SWECS) are assessed and found to be similar to those faced by other start up businesses. However, these problems are found to be aggravated by the high expectations for accelerated SWECS industry growth in the face of moderate government support and lack of investment capital. The underlying conditions of limited SWECS entrepreneur business experience, the highly competitive venture capital market, the inability of existing financial institutions to aid infant busineses and public unawareness of SWECS are reviewed. Specific manufacturer-oriented recommendations and federal, state and regulatory policy-oriented recommendations are made. In addition, the dynamics of the SWECS commercialization process are assessed and the variety of financial institutions playing a role in this process is detailed. Issues related to inflation, tax policy, regulation and federal R and D procurement policies are analyzed. (ERA citation 05:028898)

DOE/ET/15440-1 PC **A05**/MF **A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
Development of Molten Carbonate Fuel Cell Power Plant Technology. Quarterly Technical Progress Report No. 1, October 1, 1979-December 31, 1979.
Mar 80, 80p
Contract AC01-79ET15440

The overall objective of this 29-month program is to develop and verify the design of a prototype molten carbonate fuel cell stack which meets the requirements of 1990's competitive coal-fired electrical utility central station or industrial cogeneration power plants. During the first quarter, effort was initiated in all four major task areas: Task 1 - system studies to define the reference power plant design; Task 2 - cell and stack design, development and verification; Task 3 - preparation for fabrication and testing of the full-scale prototype stack; and Task-4 developing the capability for operation of stacks on coal-derived gas. In the system study task, a study baseline fuel cell system and module configuration were established. Studies to determine user requirements and to characterize the fuel cell power block and coal gasifier subsystems were initiated. Cell stack design was initiated with completion of preliminary design requirements for the cell cathodes. Laboratory tests were also initiated to identify alternative materials for separator plates, reactant manifold seals, and electrolyte tile fillers. A mechanical tape casting technique for producing 18 x 24 inch sheets of electrolyte matrix tape was successfully demonstrated in Task 3. In Task 4, theoretical and experimental studies were initiated to define the effects of known sulfur contaminants on cell performance. A literature survey was initiated to identify other possible contaminants. Planning and design efforts for construction of a mobile cell test unit were initiated. The mobile unit will be used to verify the molten carbonate cell's ability to operate on gasified coal by tests at a gasifier site. (ERA citation 05:026023)

DOE/ET/17019-1 PC **A07**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Development of Molten Carbonate Fuel Cell Power Plant. Quarterly Technical Progress Report, February 1-April 30, 1980.
J. R. Peterson. 1980, 140p
Contract AC02-80ET17019

Work has been initiated during this first quarter under all four program tasks and by all major participants as described. Task 1.0 activity (establish power plant reference design) concentrated upon definition of user requirements and establishment of power plant subsystem alternatives and characteristics. Task 2.0 work (stack and cell design development and verification) was initiated with a heavy emphasis upon test facilities preparation. A total of 27 laboratory cells were operated during this reporting period and a total of nine cells continued on test at the end of the quarter. Investigation of alternative anode and cathode materials proceeded; a dual-porosity anode was fabricated and tested. Over 10,000 endurance hours on a state-of-the-art cell carried-over from a previous program has been achieved and 1500 hours endurance has been obtained with sheet metal cells. Results presented for electrolyte structure development include comparative data for spray-dried and modified aqueous slurry process powders. Shake-down tests with a rotating disc electrode apparatus for fundamental measurements are described. Concept designs for both prototype and subscale stacks have been identified. Task 3.0 effort (development capability for full-scale stack tests) included preparation of an overall test plan to commercialization for molten carbonate fuel cells and of a functional specification for the tenth-scale stack test facility; drafts of both documents were completed for internal review. Cost-effective manufacturing assessment of available designs and processes was initiated. Task 4.0 work (develop capabilities for operation of stacks on coal-derived gas) included gathering of available contaminants concentration and effects information and preparation of initial projections of contaminant ranges and concentrations. Accomplishments to date and activities planned for the next quarter are described. (ERA citation 05:030791)

DOE/ET/20279-98 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
100-KWp Photovoltaic Power System at Natural Bridges National Monument.
F. J. Solman, J. H. Helfrich, E. F. Lyon, and A. E. Benoit. 1980, 4p CONF-800806-26
Contract AC02-76ET20279
15. intersociety energy conversion engineering conference, Seattle, WA, USA, 18 Aug 1980.

The Natural Bridges National Monument in southeastern Utah is the location of the world's largest solar photovoltaic power system. This system, which operates in a stand-alone mode without utility backup, supplies from 300 to 400 kWh/day of 60-Hz AC electrical energy to the diversified loads in the monument headquarters area. A diesel-powered generator serves as backup for the system. The solutions to a number of problems encountered in the design, fabrication, testing and early operation of the system are discussed. (ERA citation 05:030420)

DOE/ET/21002-3 PC **A03**/MF **A01**
VSE Corp., Alexandria, VA.
OTEC Support Services. Quarterly Technical Progress Report No. 8, February 15-May 14, 1980.
M. V. Lipari. May 80, 28p
Contract AC02-78ET21002

Technical engineering and management support services provided by the VSE Corporation for the Ocean Thermal Energy Conversion Program of the Ocean Systems Branch, Division of Central Solar Technology are reported. Tasks include: (1) survey, analysis, evaluation, and recommendation concerning program performance; (2) program technical monitoring; (3) development and implementation of methodology to identify and evaluate program alternatives; (4) technical assessments; (5) OTEC system integration; (6) environment and siting considerations; and (7) transmission subsystem considerations. (ERA citation 05:030469)

DOE/ET/23047-4 PC **A06**/MF **A01**
Exxon Research and Engineering Co., Linden, NJ. Advanced Energy Systems Labs.
Thin Film Polycrystalline Silicon Solar Cells. Final Report, January 1-December 31, 1979.
A. K. Ghosh, T. Feng, and H. P. Maruska. 1979, 108p
Contract AC03-79ET23047

A theory of the electrical and photovoltaic properties of polycrystalline silicon is presented. In this theory it is shown that grain boundary states play a dominant role in determining these properties of silicon. Since the grain boundary area is proportional to the grain size, these properties are related to the grain sizes. The recombination loss at grain boundaries is the predominant loss mechanism in polycrystalline solar cells. For small grain sizes, the grain boundary recombination centers affect the minority carrier lifetime more than the dopant even at large concentrations. One could fabricate 10% efficiency polycrystalline solar cells with 20 mu m thick material if the grain sizes were greater than 500 mu m .The results show that tremendous improvements in device performance can be achieved either by increasing the grain size or passivating the grain boundary states to reduce the number of recombination centers. The details of the fabrication procedures for making SnO sub 2 / n-Si, ITO/n-Si, MIS and diffused p/n junction solar cells are presented. The effects of grain boundaries on the generation of photocurrent were studied in the Scanning Electron Microscope using the EBIC technique. In addition to using the intensity modulated mode, a y- modulation technique, which gave more details, was used in the EBIC studies. By studying the Hall mobility of polysilicon in the dark and under illumination, we have developed a phenomenological theory which is capable of explaining the observed resistivity and mobility results. A comparison of the spectral response curves of SnO sub 2 /n-Si heterojunction ad diffused p/n junction cells indicates a lower diffusion length in the diffused cells. (ERA citation 05:030373)

DOE/ET/23060-1 PC **A09**/MF **A01**
Lockheed Palo Alto Research Labs., CA.
Photovoltaic Power System for the Santa Clara Community Recreation Center. Final Report, 30 September 1978-31 March 1979.
M. McCargo, G. R. Cunnington, D. R. Lott, S. R. Leacock, and D. C. Thimgan. Apr 80, 192p
Contract AC04-78ET23060

This final report documents the work performed in Phase I of the conceptual design of a 30-kW Photovoltaic Power System (PPS) for the City of Santa Clara Community Recreation Center (CRC). Detailed system analysis and optimization studies were carried out to develop system performance criteria as a function of insolation characteristic and energy cost (dollars/kWh). A single free-standing structure housing the array and all electrical equipment was chosen as the optimum system design. A lightweight steel space frame concept was adapted using a 125 x 125 ft Unistrut structure supported on four 10 x 10 ft reinforced concrete columns. The directly south-facing photovoltaic subarrays, 4 x 4 ft, are mounted atop the space-frame in rows 5 ft apart inclined at 26 degrees to the horizontal. The system optimization analysis included module electrical parameters; subarray panel size, spacing and electrical interconnector patterns; shadowing effects; array orientation; and clear-day and average-day insolation conditions. Potential benefits derived from tracking and the use of plane reflectors were also examined. Component specifications were defined for the photovoltaic array modules, power conditioning system and utility interface components. Qualification and performance testing of the candidate photovoltaic modules (OCLI and ARCO) was performed by the Jet Propulsion Laboratory, and the results were used as input data to the system analysis program. As a result of the optimized system design and analysis, a fabrication, installation, and operations plan was detailed for the Phase II and Phase III efforts. Included in the plan was a detailed consideration of the nontechnical issues associated with the implementation of the conceptual PPS. (ERA citation 05:030421)

DOE/ET/23061-1 PC **A05**/MF **A01**
Mobil Tyco Solar Energy Corp., Waltham, MA.
25 KW Solar Photovoltaic Flat Panel Power Supply for an Electrodialysis Water Desalination Unit in New Mexico. Final Report, 1 October 1978-31 May 1979.
J. R. Wood, and J. L. Crutcher. Jun 80, 100p
Contract AC04-78ET23061

The stand-alone system designed by Mobil Tyco Solar Energy Corporation consists of a 25 kW flat panel array employing silicon ribbon solar cells, used in conjunction with a lead-acid battery bank to provide the complete power requirements of an electrodialysis water desalination unit. The Mobil Tyco system design is intended to be prototypical of part of the drinking water supply for a remote village. The specific task which this system will perform during Phase III is to aid in the restoration of an aquifer following a uranium leaching operation by the Energy Minerals Division of Mobil Oil Corporation at a site which is approximately four miles from the township of Crownpoint in northwestern New Mexico. System design is described, and a detailed description of a mathematical

model and computerized simulation of the system is included. (ERA citation 05:030422)

DOE/ET/23064-1 PC **A10**/MF **A01**
Solar Power Corp., Woburn, MA.
194 Kilowatt Solar Photovoltaic Flat Panel Power System for the Combined Beverly High School/C.H. Patten Vocational High School, Beverly, Massachusetts. Final Technical Report, October 1, 1978-March 31, 1979.
R. R. Addiss, Jr., and P. A. Lawson. Jun 80, 202p
Contract AC04-78ET23064

The 194 kW system consists of the photovoltaic array, the inverter/control subsystem, the building and utility interface, and the monitoring subsystem. The photovoltaic array consists of 56 separate subarrays of 112 photovoltaic modules each, deployed in rows on the southerly facing slope north of the school building. The wiring scheme permits individual modules to be disconnected without a radical change in subarray output current. Power is transmitted at 4160 V from the inverters and a step-up transformer to the main 4160 V utility feed line in the school. Separate metering measures power bought and sold. At the optimum tilt angle of 40 exp 0 , the array provides 232 MWh of ac energy annually, or 17% of the school load. It provides a good match to the summer daily load profile, resulting primarily from the central air-conditioning. Some power is sold to the utility throughout the year, mainly on weekends. The immediate impact is an $8000 saving in the annual utility bill. Levelized busbar energy costs are reduced from $2/kWh to $1/kWh when site-specific parameters are used in the analysis instead of the JPL-specified nominal values. A fault detection and isolation scheme which can find a single module failure is incorporated into the monitoring subsystem. (ERA citation 05:030423)

DOE/ET/23103-16 PC **A07**/MF **A01**
Delaware Univ., Newark. Coll. of Engineering.
Theory of Thin-Film Photovoltaics. Eight Month Summary Report.
K. W. Boeer. 1979, 131p
Contract AC01-79ET23103

The program called for further development of the physics theory of thin-film photovoltaics with the goal to identify important experimental parameters and their optimum range, to prepare means to measure, monitor and adjust such parameters in order to provide guidance for obtaining solar cells with improved cost-efficiency. Specifically, it was proposed to improve the present diode plus current generator model and reduce the improved model to a workable bench-type model. Following the proposed program it was first attempted to obtain a better understanding of non-ideal characteristics. As a result of this work, we are now able to classify such characteristics in nonexponential and exponential characteristics, caused mainly by a difference in junction (interface) recombination with s/sub j/ approx. > 10 exp 6 cm/s and s/sub j/ approx. < 10 exp 6 cm/s for the two groups respectively. From the first group, one can easily extract junction material parameters such as the trap level distribution near the Fermi level, maximum fields and the widths of the junction. From the second group, such determination is no longer possible; however, a wide range of exponential A-factors, even in excess of 2, can be explained with changing interface recombination, caused by transition saturation. The obtained results can be expressed in a simple algebraic form and this provides a very encouraging basis for developing a bench-type model. Experiment and theory are in good agreement. (ERA citation 05:030374)

DOE/ET/29100-11 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Energy Sources and Systems Simulation Lab.
Security Assessment of Power Systems Including Energy Storage and with the Integration of Wind Energy. Progress Report, October 1, 1979-December 31, 1979.
D. P. Carroll, and P. C. Krause. Jan 80, 23p
Contract EC-77-S-02-4206

Progress in wind energy studies is reported. During this quarter two areas were pursued: wind turbulence models and their effect on unsteady shaft torque of horizontal machines; and reduced order aerodynamic models of wind machines. (ERA citation 05:030592)

DOE/EV-0089 PC **A04**/MF **A01**
Bolt, Beranek, and Newman, Inc., Cambridge, MA.
Preliminary Analysis of the Audible Noise of Constant-Speed, Horizontal-Axis Wind-Turbine Generators.
D. N. Keast, and R. C. Potter. Jul 80, 72p
Contract AP01-79EV10014

An analytical procedure has been developed for calculating certain aerodynamic sound levels produced by large, horizontal-axis wind-turbine generators (WTG's) such as the DOE/NASA Mods-0, -0A, -1, and -2. This preliminary procedure is based upon very limited field data from the Mod-0. It postulates a noise component due to the (constant) rotation of the blades of the WTG, plus a wake-noise component that increases with the square of the power produced by the WTG. Mechanical sound from machinery, and low-frequency impulsive sounds produced by blade interaction with the wake of the support tower are not considered. (ERA citation 05:030585)

DOE/EV/10142-1 PC **A12**/MF **A01**
New Mexico Univ., Albuquerque. Dept. of Economics.
Benefit-Cost Framework for Analysis of Trace Element Emissions from Coal-Fired Power Plants.
Nov 79, 252p
Contract AC02-79EV10142

The major conclusions of this report may be summarized in the following four points: (1) It is probable that atmospheric emissions of trace elements from Southwestern coal-fired power plants will not cause major problems over the next 20 years. But monitoring for trace element build-up (especially mercury, selenium, and arsenic) in the mountains of southern Colorado, Navajo Reservoir, and other local hot spots would be an important and desirable step. (2) It appears that damage from trace elements in disposed ash is more likely than damage from atmospheric trace element emissions. But whether damage from disposed ash will actually occur is highly uncertain. We recommend that additional research be conducted on the entire range of issues surrounding ash disposal. (3) In the area of legislation and regulation, there may be some need for review of regulations concerning trace element atmospheric emissions. Present regulation of ash disposal is very likely to need revision and extension. (4) Future research on the environmental problems of coal-fired power plants should place emphasis on atmospheric emissions of sulfur and nitrogen oxides; consequent problems of acid precipitation also need exploration. Environmental research on coal-fired power plants does not need to exclude other problems. But issues surrounding sulfur emissions, nitrogen emissions, sulfate transformations, and acid precipitation appear to merit major emphasis. Perhaps the most important aspect of the preceding list of conclusions is that more questions are raised than are answered. As work on the subject proceeded, it became apparent that an important task was to point future research in the right direction. (ERA citation 05:030603)

DOE/ID/01783-1 PC **A05**/MF **A01**
CH2M/Hill, Sacramento, CA.
Lower Main Canal Hydro Stations. Feasibility Assessment Report.
Nov 78, 90p
Contract EW-78-F-07-1783

A feasibility assessment of small hydroelectric powerplants on the MID Lower Main Canal at Modesto Reservoir and Stone Drop is presented. Included are results of analyses covering alternative layouts for civil works and alternative turbine-generator units. The analyses were conducted at a feasibility level as were quantity takeoffs and construction cost estimates. This evaluation indicates that it is technically feasible to construct powerplants at the Modesto Reservoir and Stone Drop sites. (ERA citation 04:042523)

DOE/JPL-1060-35 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Cost and Price Estimate of Brayton and Stirling Engines in Selected Production Volumes.
H. R. Fortgang, and H. F. Mayers. 31 May 80, 15p
Contract AI01-79ET20397

This report details the methods used to determine the production costs and required selling price of Brayton and Stirling engines modified for use in solar power conversion units. The Brayton engine, designed by Garrett AiResearch Manufacturing Company, was upgraded to a 20 kW design. The Stirling 30 kW engine was designed by United Stirling of Sweden for non-solar applications. Each engine part, component and assembly was examined and evaluated to determine the costs of its material and the method of manufacture based on specific annual production volumes. Cost estimates are presented for both the Stirling and Brayton engines in annual production volumes of 1000, 25,000, 100,000, and 400,000. At annual production volumes above 50,000 units, the costs of both engines are similar, although the Stirling engine costs are somewhat lower. It was concluded that modifications to both the Brayton and Stirling engine designs could reduce the estimated costs. (ERA citation 05:028651)

DOE/JPL/954355-79/3 PC **A05**/MF **A01**
Mobil Tyco Solar Energy Corp., Waltham, MA.
Large Area Silicon Sheet by EFG. Annual Progress Report, October 1, 1978-September 30, 1979.
14 Mar 80, 78p
Contract NAS-7-100-954355

The progress which has been made in 1978/1979 to evolve systems designs for growth stations which produce multiple silicon ribbons by the EFG process is reported. This progress culminated in the demonstration of five ribbon multiple growth in May 1979 and in recent advances toward improved electronic quality of ribbons grown from these machines. These advances were made in large measure by studies in which the composition of the gas environment around the meniscus area was varied. By introducing gases such as CO sub 2 , CO, and CH sub 4 into this region, reproducible increases in diffusion length and cell performance have been realized, with the best large area (5 cm x 10 cm) cells exceeding 11% (AM1) efficiency. (ERA citation 05:030377)

DOE/JPL/954654-80/11 PC **A09**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Silicon Web Process Development. Annual Report.
C. S. Duncan, R. G. Seidensticker, J. P. McHugh, F. E. Hill, and M. E. Skutch. 30 Jun 80, 184p
Contract NAS-7-100-954654

During this reporting period significant milestones have been met. A new barrier crucible design which consistently maintains melt stability over long periods of time has been successfully tested and used in long growth runs. The pellet feeder for melt replenishment was operated continuously for growth runs of up to 17 hours (a one day growth cycle). The liquid level sensor comprising a laser/sensor system was operated, performed well, and meets the requirements for maintaining liquid level height during growth and melt replenishment. An automated feedback loop connecting the feed mechanism and the liquid level sensing system was designed and constructed and, during the preparation of this report, operated successfully for 3 1/2 hours demonstrating the feasibility of semi-automated dendritic web growth. The web throughput task has resulted in a demonstration of wider good quality web as well as a demonstration of higher throughput rates. The accomplishments during the report period are described in detail. The economic analysis of the dendritic web process was updated. The sensitivity of the cost of sheet to variations in capital equipment cost and recycling dendrites was calculated; and it was shown that these factors have relatively little impact on sheet cost. An important finding was that dendrites from web which had gone all the way through the solar cell fabrication process, when melted and grown into web, produce crystals which show no degradation in cell efficiency. Material quality remains high and cells made from web grown at the start, during, and the end of a run from a replenished melt show comparable efficiencies. (ERA citation 05:030378)

DOE/JPL/955055-80/5 PC **A04**/MF **A01**
Spectrolab, Inc., Sylmar, CA.

Silicon Solar Cell Process Development, Fabrication and Analysis. Quarterly Report for Period Ending December 31, 1979.
J. A. Minahan. 1980, 63p
Contract NAS-7-100-955055

Solar cells have been fabricated from unconventional sheet silicon in Phase II of this contract. Preparations have been made for measurement of cells under AM1 conditions. This has been accomplished by utilization of existing Pyrex water filters in combination with the X-25 Spectrolab Solar Simulator. Several experimental runs have been made utilizing screen printed silver contacts. Mobil-Tyco EFG silicon, Westinghouse web silicon and Crystal Systems heat exchange method silicon have been fabricated into solar cells by the baseline process. (ERA citation 05:030380)

DOE/JPL/955640-80/2 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Development and Fabrication of a Solar Cell Junction Processing System. Quarterly Report No. 2, July 1980.
R. Siesling. Jul 80, 35p
Contract NAS-7-100-955640

The basic objectives of the program are the following: (1) to design, develop, construct and deliver a junction processing system which will be capable of producing solar cell junctions by means of ion implantation followed by pulsed electron beam annealing; (2) to include in the system a wafer transport mechanism capable of transferring 4-inch-diameter wafers into and out of the vacuum chamber where the ion implantation and pulsed electron beam annealing processes take place; (3) to integrate, test and demonstrate the system prior to its delivery to JPL along with detailed operating and maintenance manuals; and (4) to estimate component lifetimes and costs, as necessary for the contract, for the performance of comprehensive analyses in accordance with the Solar Array Manufacturing Industry Costing Standards (SAMICS). Under this contract the automated junction formation equipment to be developed involves a new system design incorporating a modified, government-owned, JPL-controlled ion implanter into a Spire-developed pulsed electron beam annealer and wafer transport system. When modified, the ion implanter will deliver a 16 mA beam of exp 31 P exp + ions with a fluence of 2.5 x 10 exp 15 ions per square centimeter at an energy of 10 keV. The throughput design goal rate for the junction processor is 10 exp 7 four-inch-diameter wafers per year. (ERA citation 05:030381)

DOE/JPL/955696-80/1 PC **A03**/MF **A01**
Lockheed Missiles and Space Co., Sunnyvale, CA.
Laser Annealing of Ion Implanted CZ Silicon for Solar Cell Junction Formation. Quarterly Report No. 1.
J. S. Katzeff. Jul 80, 35p
Contract NAS-7-100-955696

A project to evaluate the merits of large spot size pulsed laser annealing of ion implanted silicon wafers for junction formation on solar cells is described. A Q-switched Nd:Glass laser system is used operating in the 1064 (regular) and 532 (with frequency doubler) nm wavelengths. The laser output is in excess of 30 joules with a 20 to 50 ns pulse duration. Material used in this investigation is 3-inch diameter CZ silicon, P-type 0.014 inches thick, 10 omega -cm resistivity, <100> orientation. Three wafer surface conditions are being evaluated in this pulse annealing investigation: chem-polished, texture etched, and flash etched. Annealing was performed with and without beam homogenization. Both modes showed excellent lattice recovery from the implant-induced damage as analyzed using Rutherford backscattering techniques. Homogenization of the beam was performed using a fused silica rod configured with a 90 exp 0 bend. The unhomogenized annealing was performed using a plano-concave lens. Fabrication of laser annealed cells using both modes is forthcoming. (ERA citation 05:030382)

DOE/NASA/0002-80/2(V.2) PC **A12**/MF **A01**
Boeing Engineering and Construction, Seattle, WA.
MOD-2 Wind Turbine System Concept and Preliminary Design Report. Volume II. Detailed Report.
Jul 79, 269p NASA-CR-159609(V.2)
Contract AI01-79ET20305

This report documents the work accomplished during the Concept Design and Preliminary Design phases of NASA Contract DEN 3-2. These phases were designated the Task II Analyses and Design phases of the MOD-2 Wind Turbine System (WTS) project. The features and characteristics of the MOD-2 WTS evolved from a series of trade studies, inputs from NASA and several electric utility companies, and other analyses. Major features include an upwind rotor with a teetering hub and partial span pitch control; a planetary, light weight step-up gearbox driving a synchronous generator; and a low natural frequency (soft) steel shell tower. Supporting analyses and test data used in the design studies are presented. Methodology to assure accuracy of such analyses and data are included. Production and construction methods and development tests are reported to show the method by which BEC will assure that the specified design will perform as predicted, and that it will meet the maintenance and reliability standards established. (ERA citation 05:030586)

DOE/NASA/0052-79/1 PC **A16**/MF **A01**
General Electric Co., Philadelphia, PA. Space Sciences Lab.
Parametric Study of Potential Early Commercial MHD Power Plants.
C. H. Marston, F. N. Alyea, and D. J. Bender.
Feb 80, 372p NASA-CR-159634
Contract AI01-77ET10769

A parametric study was performed to determine performance and cost of moderate technology coal-fired Open Cycle MHD/steam power plant designs which can be expected to require a shorter development time and have a lower development cost than previously-considered mature OCMHD/Steam plants. Three base cases were considered: Base Case 1 had an indirectly-fired high temperature air heater (HTAH) subsystem delivering air at 2700 F; fired by a state-of-the-art atmospheric pressure gasifier; Base Case 2 had an indirectly-fired HTAH subsystem delivering air at 3000 F; in Base Case 3 the HTAH subsystem was deleted and oxygen enrichment was used to obtain requisite MHD combustion temperature. Coal pile to bus bar efficiencies in Base Case 1 ranged from 41.4% to 42.9%, and cost of electricity (COE) was highest of the three base cases. For Base Case 2 the efficiency range was 42.0% to 45.6%, and COE was lowest. For Base Case 3 the efficiency range was 42.9% to 44.4%, and COE was intermediate. The best parametric cases in Base Cases 2 and 3 are recommended for conceptual design. Eventual choice between these approaches is dependent on further evaluation of the tradeoffs among HTAH development risk, O sub 2 plant integration and further refinements of comparative costs. (ERA citation 05:030785)

DOE/NOAA/OTEC-1 PC **A06**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Effects of Shear and Roughness on Vortex Sheeding Patterns Behind a Circular Cylinder at Critical Reynolds Numbers.
D. M. Rooney, and R. D. Peltzer. Oct 79, 114p
Contract EG-77-A-29-1078

This test program was undertaken to further the understanding of vortex shedding patterns to be experienced by the OTEC Cold Water pipe. The present series of tests was planned to incorporate improvements in design of the previously used test model and data gathering capability in order to achieve certain results which the previous program was unable to achieve. Specifically, three goals were envisioned: (1) determination of eddy shedding correlation lengths as a function of upstream shear. Improved endplate design and larger aspect ratio were the chief steps taken toward attaining this objective. (2) Determination of minimum shear level producing cellular shedding patterns. A wider range of upstream velocity shears was to be tested than in any previous study. (3) Detailed analysis of the effect of roughness on shedding patterns. A very smooth cylinder was to be tested under the same conditions as a roughened cylinder, and the two sets of results compared. Two weeks of wind tunnel testing were scheduled to perform the tests. The first week was aliotted to the roughened cylinder, and the second week was devoted to examining the smooth cylinder. The experimental setup and procedures are described, and results are presented and discussed. (ERA citation 05:030470)

EPRI-AP-1393 PC **A09**/MF **A01**
Westinghouse Electric Corp., Concordville, PA.
Gasification Combined-Cycle Plant Configuration Studies. Final Report.
R. W. Foster-Pegg, and R. V. Garland. Jun 80, 180p

This report presents the results of a Texaco based coal gasification combined cycle configuration study in which current technology combustion turbines are applied with the ultimate objectives being: (1) determine a plant configuration that yields high efficiency; and (2) determine and quantify the influence of plant configuration and plant operating conditions on performance. Best efficiency, about 39% based on coal HHV (8840 Btu/kWh), is attained by integrating the gasification and gas cleanup system with the combined cycle. A reheat steam turbine operating at highest steam conditions practicable is also required along with a hot fuel gas expander which operates at 1000 exp 0 F inlet temperature. The cycle can be simplified considerably by reducing the steam temperature to 950 exp 0 F and deleting the fuel gas expander. These actions result in a heat rate increase of only about 2%. Further simplification is achieved by replacing the reheat steam turbine with a non-reheat machine which in turn simplifies the heat recovery steam generator configuration. The end result is an increase in heat rate of about 8% over the most efficient configuration, but the resultant heat rate is still lower than that expected for conventional coal fired power plants. One of the most challenging developmental efforts required to achieve a plant configuration that will operate at the highest efficiency relates to the integration of the gasification system with the combined cycle. A raw gas cooler is required which must operate in a hostile atmosphere at temperatures in the 1400 exp 0 F to 2400 exp 0 F range and must superheat and reheat steam to 1000 exp 0 F. The difference in overall plant performance using a simple design gas cooler versus a complicated one amounts to a portion of the 2% increase in heat rate mentioned above. (ERA citation 05:030597)

EPRI-CS-1439(V.2) PC **A04**/MF **A01**
SRI International, Menlo Park, CA.
Investigation of High SO sub 2 Removal Design and Economics. Final Report. Volume 2. Economics.
E. D. Oliver. Jun 80, 65p

The Clean Air Act Amendments of 1977 require the Environmental Protection Agency to set new standards for control of sulfur dioxide emissions. SRI International estimated capital costs and incremental revenue requirements for flue gas desulfurization (FGD) to meet increasingly stringent SO sub 2 removal requirements. These costs were estimated by SRI for 14 conceptual designs based on process conditions and material balances determined by Radian Corporation. Analyses of these designs show the effects of various levels of SO sub 2 removal on the costs of burning eastern high-sulfur, high chlorine coal and western low-sulfur, low-chlorine (compliance) coal, using limestone, lime, and regenerative magnesia scrubbing. Total capital requirement for FGB ranges from $123 to $213/kW (January 1979 dollars), if 25% spare capacity is provided for reliability. The sulfur compliance coal chosen in this study does not require FGD under the old standard (520 ng/J or 1.2 lb SO sub 2 emission/million Btu), but the incremental 30-year levelized busbar cost is 8 to 9 mill/kWh if a high percentage of SO sub 2 removal is required. For eastern coal, revenue requirements increase less than 3 mill/kWh as removal requirements are tightened. (ERA citation 05:030605)

EPRI-CS-1474 PC **A06**/MF **A01**
Dynatech R/D Co., Cambridge, MA.
Wet/Dry Cooling for Cycling Steam-Electric Plants. Final Report.
E. C. Guyer, and D. L. Brownell. Aug 80, 108p

The economics of water-conserving wet/dry cooling systems for steam-electric plants used for cycling or intermediate-load duty have been evaluated using a system simulation and design optimization computer model. Conclusions are based on the case-study evaluation of a separate wet and dry tower system which provides cooling for a nominal 500 MWe coal-fired plant for two site locations - Boston, Massachusetts, and Phoenix, Arizona. Historical utility load and meterological data which are coincidental have been used along representative utility system generation models to describe the economic and physical environment for the operation of the wet/dry systems. Optimum cooling system costs and designs assuming economically-dispatched cycling operation schedules are presented and compared to the costs and designs determined for base-load operation. All-wet and all-dry cooling systems have been evaluated in addition to wet/dry systems of different total annual water consumption. Consideration has been given to the impact of the design plant capacity factor on the incremental power production cost due to heat rejection, the selection of the steam turbine, the determined value of makeup water, and the economic consequences of operation at an off-design capacity factor. (ERA citation 05:030596)

EPRI-EM-1365 PC **A04**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Evaluation of DIGAS Cooling for Utility Fuel Cell Power Plants. Final Report.
E. V. Somers, R. E. Grimble, and E. J. Vidt. Mar 80, 53p

This project assesses the technical and economic feasibility of pressurized gas-cooled fuel cell stacks for dispersed electric utility power plants. The gas-cooling concept, termed DIGAS, recirculates cathode vent gas through the fuel stack to cool the cells. The heat extracted by the cooling gas is then used to generate steam for the fuel processor and other uses. The efficient recovery of the heat at high temperature requires recirculation of most of the gas exhausted from the fuel cell through an external heat exchanger with ratios of the recirculating-gas-to-makeup-air of between 15:1 to 60:1. The evaluation developed is aimed at determining conceptual sizes and ratings and preliminary costs of the heat exchangers and recirculating fan in the recirculating gas loop, and at evaluating performance of 5 MW fuel cell power plants utilizing the DIGAS concept. Several conceptual designs of 5 MW DIGAS-cooled phosphoric-acid fuel-cell power plants operating on a naphta-type hydrocarbon are developed that yielded heat rates between 8700 and 9100 Btu per kWh. The conceptual design of a 10 kW proof-of-concept demonstration subsystem is also prepared. The operating characteristics of the fuel cell and fuel processor which greatly affect the recirculating loop operation and, in turn, the plant heat rate and piping configuration are: average temperature and pressure in the fuel cell; saturation pressure and temperature of the steam for the reformer; and the molar ratio of reformer steam-to-carbon in the fuel to the fuel processor. Conceptual plant designs show that naphtha-fueled phosphoric-acid fuel-cell power plants that are DIGAS-cooled should attain good heat rate performance with economically acceptable recirculation loop piping configurations. (ERA citation 05:030792)

FE-2357-39(V.B) PC **A04**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
PFB Coal Fired Combined Cycle Development Program. Advanced Hot Gas Cleanup Concept Evaluation (Task 4.3). Volume B. Developmental Cyclone Evaluation.
Feb 80, 73p
Contract EX-76-C-01-2357

This report summarizes the results of cold flow model testing of a conventional reverse-flow cyclone containing several developmental features designed to improve its separative performance. The four advanced features evaluated were: Outlet Scroll Skimming - to remove particles from the high dust concentration region at the periphery of the outlet dust; Base Purge - to reduce reentrainment of dust from the disengagement hopper; Increased Outlet Duct Engagement - to reduce short-circuiting of the inlet dust into the outlet; and Vortex Shield - to stabilize the point of vortex attachment at the cyclone base and thus reduce base pickup. A schematic of the advanced cyclone, showing the various developmental features, is provided. The results of the cold flow experiments showed that substantial improvement (approximately 30% reduction in exhaust emission) could be obtained from outlet skimming or from increased engagement of the exhaust dust. Furthermore, the effects of these features are additive so that about 60% overall reduction in emissions could be achieved by incorporating both of these elements. On the other hand, the vortex shield and the base purge had little effect on the separative performance. Almost all of the experimental results exhibited strong electrostatic influence. At high flowrates, the separative performance of the cyclone decreased as the flowrate was reduced, as expected from cyclone theory. Although the improvements obtained with the developmental cyclone are significant, further improvements appear possible with the Air Shield cyclone and the Electrocyclone. Consequently, subsequent efforts under the CFCC program were focused on these concepts. (ERA citation 05:030607)

HEDL-TC-1599 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Electro-Thermal Infrared Scanning Method for Polycrystalline Solar Cells.
D. R. Green. Jul 80, 31p
Contract AC14-76FF02170

Techniques for rapidly scanning solar cells to determine differences in basic parameters at different locations should provide improved understanding of fabrication variables that influence polycrystalline cell performance. Hence, such techniques should aid development of efficient polycrystalline cells, and provide rapid feedback to correct or optimize manufacturing variables. An electro-thermal method of scanning cells, using a sensitive noncontacting infrared scanner to map temperatures produced by a current pulse, has been demonstrated. Single-crystal Al/Si as well as polycrystalline Al/Si and Cu/Cu sub 2 O thin-film Schottky barrier cells were included in this work. Laser scans in which cell short circuit output was mapped as a function of light-spot position were performed for comparison with the electro-thermal infrared results. Some basic mechanisms involved in the electro-thermal results have been proposed. However, they are not yet completely understood. Experimental results are presented, and some of the proposed relationships between basic cell parameters and electro-thermal scan results are discussed. Although the work was conducted mainly with Schottky diodes, the electro-thermal method can also be applied to N-P and P-N photovoltaic cells. (ERA citation 05:030383)

HEDL-TC-1728 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Applications of Ellipsometry to Solar Cell Research.
D. R. Green, and L. C. Olsen. Jul 80, 15p
Contract AC14-76FF02170

Ellipsometry can be utilized for both optical and structural characterization of materials. Possible applications of ellipsometry to solar cell development include determination of thickness and optical constants of: (1) thin insulator films formed on semiconductor substrates, such as used in MIS cells; (2) semiconductor films or substrates; (3) metal films; and (4) antireflection (AR) coatings. These applications are discussed; the basic equations of ellipsometry are presented; and commercial ellipsometers are described. (ERA citation 05:030384)

K/CSD/INF-79/23 PC **A02**/MF **A01**
Union Carbide Corp., Oak Ridge, TN. Nuclear Div.
Laser Annealing of Solar Cell Wafers.
G. E. Giles, J. R. Kirkpatrick, and R. F. Wood. 1980, 8p CONF-800723-11
Contract W-7405-ENG-26
19. national heat transfer conference, Orlando, FL, USA, 27 Jul 1980.

Laser annealing of ion implanted silicon offers great promise in the manufacture of low cost, high efficiency solar cells and other semiconductor devices. A high-power, short pulse laser beam is used to melt a thin surface layer which resolidifies leaving a regrown single crystal structure. The dopant atoms tend to occupy substitutional sites. The damage to the crystal produced by the dopant implantation process is removed producing a better semiconductor device than the conventional method of thermal annealing. Numerical methods for heat transfer with phase change and for dopant diffusion during melting are presented with comparison to experimental data. (ERA citation 05:030385)

LBL-10799 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Oxygen Reduction on Supported Pt Alloys and Intermetallic Compounds in Phosphoric Acid.
P. N. Ross, Jr. Mar 80, 85p
Contract W-7405-ENG-48

The objectives of this study are to conduct kinetic studies at all experimental conditions of interest on a standard, state-of-the-art Pt fuel cell electrocatalyst to establish a control activity level. The electrocatalyst chosen for this purpose was a 10 w/o Pt on Vulcan XC-72R carbon black supplied by Prototech. Pt binary alloys were prepared in supported form with the alloying constituents Ti, Zr, Hf, V, Nb, Ta, and also Al, Re, and W. The resulting catalysts were characterized by transmission electron microscopy (TEM), x-ray emission (XES), selected area microdiffraction (SAD) and conventional x-ray powder diffraction (XRD). The alloys were examined for stability in hot H sub 3 PO sub 4 at electrode potentials of practical interest. The kinetic characteristics of oxygen reduction on (stable) Pt alloys were determined and compared to the state-of-the-art Pt fuel cell catalyst material. Procedures are described, and results are presented and discussed. (ERA citation 05:030794)

N80-29842/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Satellite Power Systems (Sps): Concept Development and Evaluation Program: Preliminary Assessment.
Sep 79, 19p NASA-TM-81142, DOE/ER-0041
Sponsored by DOE.

A preliminary assessment of a potential Satellite Power System (SPS) is provided. The assessment includes discussion of technical and economic feasibility; the effects of microwave power transmission beams on biological, ecological, and electromagnetic systems; the impact of SPS construction, deployment, and operations on the biosphere and on society; and the merits of SPS compared to other future energy alternatives.

N80-29845/8 PC **A03**/MF **A01**
General Dynamics/Convair, San Diego, CA.
Study of Power Management Technology for Orbital Multi-100KWE Applications. Volume 3: Requirements.
J. W. Mildice. 15 Jul 80, 37p NASA-CR-159834, GDC-ASP-80-015
Contract NAS3-21757
3.

Mid to late 1980's power management technology needs to support development of a general purpose space platform, capable of supplying 100 to 250 KWe to a variety of users in low Earth orbit are examined. A typical, shuttle assembled and supplied space platform is illustred, along with a group of payloads which might reasonably be expected to use such a facility. Examination of platform and user power needs yields a set of power requirements used to evaluate power management options for life cycle cost effectivness. The most cost effective ac/dc and dc systems are evaluated, specifically to develop system details which lead to technology goals, including: array and transmission voltages, best frequency for ac power transmission, and advantages and disadvantages of ac and dc systems for this application. System and component requirements are compared with the state-of-the-art to identify areas where technological development is required.

N80-29852/4 PC **A04**/MF **A01**
Communications Satellite Corp., Clarksburg, MD.

Thin n-i-p Radiation-Resistant Solar Cell Feasibility Study.
Final Report.
J. F. Allison, R. A. Arndt, and A. Meulenberg, Jr..
Jun 80, 70p NASA-CR-159871
Contract NAS3-21280

Silicon solar cells were fabricated to verify the predictions that: (1) thin n(+)pp(+) cells can provide high values of open circuit voltage even when high resistivity base material (1000 omega-cm) is used; (2) cells with good p(+) back contacts will display an increase in open circuit voltage with decreasing cell thickness; and (3) high quality, thin, high resistivity, solar cells can be made using processing compatible with conventional practice. Analysis of I-V and spectral response measurements of these cells confirmed theoretical predictions and thereby pointed to voltages beyond the near 600 mV obtained in this study.

N80-29859/9 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Urban Solar Photovoltaics Potential: An Inventory and Modelling Study Applied to the San Fernando Valley Region of Los Angeles.
G. L. Angelici, N. A. Bryant, R. K. Freta, and S. Z. Friedman. 15 Aug 80, 47p NASA-CR-163436, JPL-PUB-80-43
Contract NAS7-100

Procedures for analyzing the potential of solar photovoltaic collectors to meet energy requirements in a metropolitan region are described and a modeling effort is applied to the San Fernando Valley region of Los Angeles. The procedure involves a series of steps designed to produce maps and tabulations revealing the amount of rooftop area available for establishing solar collectors and the proportion of energy requirement that could be potentially supplied by solar photovoltaics within each of the 533 mainline feeder service areas in the study area. For the sixty five square mile study area, the results showed that, with half the available flat and south facing roofs used and assuming the availability of energy storage, 52.7 percent of the actual kWh energy requirements could have been met in 1978 using photovoltaic collectors. Hourly, daily, weekly, and monthly fluctuations in potential supply and actual loads and recommendations of avenues for further research are discussed. Some further potential applications of the modeling technique are suggested.

N80-29862/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Rapporteur Report: Mhd Electric Power Plants.
G. R. Seikel. 1980, 17p NASA-TM-81554, DOE/NASA/2674-12
Contract EF-77-A-01-2674
Presented at 7TH Intern. Conf. On Mhd Elec. Power Generation, Cambridge, Mass. 16-20 Jun. 1980.

Five US papers from the Proceedings of the Seventh International Conference on MHD Electrical Power Generation at the Massachusetts Institute of Technology are summarized. Results of the initial parametric phase of the US effort on the study of potential early commercial MHD plants are reported and aspects of the smaller commercial prototype plant termed the Engineering Test Facility are discussed. The alternative of using a disk geometry generator rather than a linear generator in baseload MHD plants is examined. Closed-cycle as well as open-cycle MHD plants are considered.

N80-29877/1 PC **A03**/MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Center.
Standard Procedures for Terrestrial Photovoltaic Performance Measurements: Specification No. 101.
1979, 40p EUR-6423EN

Since the response of a solar cell is wavelength-dependent, its performance is significantly affected by the spectral energy distribution of the radiation, which in the case of natural sunlight varies with location, weather, time of year, and time of day. If the irradiance is measured with a thermopile-type radiometer, which is not spectrally selective, rated power measurements can vary by as much as 15% from day to day at the same place. The procedures are designed to minimize such discrepancies by relating the performance to a standard terrestrial solar spectral energy distribution, hereafter referred to as standard sunlight. This is done by measuring irradiance with a reference solar cell or module which has been calibrated at 25 + or -2 C in terms of short circuit current per unit of standard sunlight irradiance by an approved Solar Cell Calibration Agency. The reference cell automatically takes account of variation in spectral distribution. If the performance of a cell, module or array is related to a known standard sunlight distribution, it is possible to compute within a reasonable tolerance its performance in light or any other known spectral energy distribution.

N80-29878/9 PC **A02**/MF **A01**
European Space Research and Technology Center, Noordwijk (Netherlands).
European Technology Applicable to Solar Power Satellite Systems (Sps).
H. Stoewer. 1979, 24p INKA-CONF-79-378-046, CONF-7909124-1
Presented at the 30TH Congr. Of the Intern. Astronautical Federation, Munich, 16 Sep. 1979.

The Solar Power Satellite System (SPS) stands for a concept which is intended to collect energy in Earth orbit, transmit it to the Earth and convert it on the ground into electric energy. This paper summarizes European space technology activities that might have potential for application in a possible future Solar Power Satellite System (SPS) program. Before a decision in favor of or against an SPS development program can be made, several critical technology areas must be investigated in order to assess with a reasonable degree of confidence the potential benefits, cost and development risks associated with an SPS. Existing and developing European space technologies are compared with the expected requirements of a study assessment and early key technology verification investigations for SPS concept. It is shown that a number of existing European space technologies and the results of current development efforts apply well to this. However, very substantial advances in almost all technological areas will be necessary before a prudent decision for implementation of an SPS can be made.

N80-29886/2 PC **A03**/MF **A01**
Argonne National Lab., IL. Integrated Assessments and Policy Evaluations Group.
Preliminary Comparative Assessment of Land Use for the Satellite Power System (Sps) and Alternative Electric Energy Technologies.
D. E. Newsom, and T. D. Wolsko. Apr 80, 26p NASA-CR-163327, DOE/ER-0054
Contract W-31-109-ENG-38
Sponsored by NASA.

A preliminary comparative assessment of land use for the satellite power system (SPS), other solar technologies, and alternative electric energy technologies was conducted. The alternative technologies are coal gasification/combined-cycle, coal fluidized-bed combustion (FBC), light water reactor (LWR), liquid metal fast breeder reactor (LMFBR), terrestrial photovoltaics (TPV), solar thermal electric (STE), and ocean thermal energy conversion (OTEC). The major issues of a land use assessment are the quantity, purpose, duration, location, and costs of the required land use. The phased methodology described treats the first four issues, but not the costs. Several past efforts are comparative or single technology assessment are reviewed briefly. The current state of knowledge about land use is described for each technology. Conclusions are drawn regarding deficiencies in the data on comparative land use and needs for further research.

N80-29887/0 PC **A02**/MF **A01**
Argonne National Lab., IL. Integrated Assessment and Policy Evaluation Group
Selection of Alternative Central-Station Technologies for the Satellite Power System (Sps) Comparative Assessment.
M. E. Samsa. Apr 80, 19p DOE/ER-0052
Contract W-31-109-ENG-38
Sponsored by NASA.

An important effort is the Satellite Power System (SPS) comparative Assessment is the selection and characterization of alternative technologies to be compared with the SPS concept. The ground rules, criteria, and screening procedure applied in the selection of those alternative technologies are summarized. The final set of central station alternatives selected for comparison with the SPS concept includes: (1) light water reactor with improved fuel utilization, (2) conventional coal combustion with improved environmental controls, (3) open cycle gas turbine with integral low Btu gasifier, (4) terrestrial photovoltaic, (5) liquid metal fast breeder reactor, and (6) magnetic confinement fusion.

N80-29897/9 PC **A03**/MF **A01**
PRC Energy Analysis Co., McLean, VA.
Some Questions and Answers About the Satellite Power System (Sps).
Jan 80, 46p NASA-CR-163329, DOE/ER-0049/1
Contract DE-AC01-79ER-10041
Sponsored by NASA.

Progress in the evaluation of the concept of obtaining significant amount of electrical energy from space through the Satellite Power System is reported. The Concept Development and Evaluation Program plan is described including: systems definition, environmental assessment, societal assessment, and comparative assessment.

N80-29900/1 PC **A09**/MF **A01**
Department of Energy, Washington, DC. Office of Energy Research.
Satellite Power System (Sps) FY 79 Program Summary.
Jan 80, 200p NASA-CR-163479, DOE/ER-0037

The Satellite Power System (SPS) program a joint effort to develop an initial understanding of the technical feasibility, the economic practicality, and the social and environmental acceptability of the SPS concept is discussed. This is being accomplished through implementation of the Concept Development and Evaluation Program Plan which is scheduled for completion by the end of FY 1980. This Program Summary not only covers FY 1979 but includes work completed in FY 1977 and FY 1978 in order to give a comprehensive picture of the DOE involvement in the SPS concept development and evaluation process.

N80-29907/6 PC **A05**/MF **A01**
Battelle Inst., Frankfurt am Main (Germany, F.R.).
Development of a Cadmium Selenide Thin Film Solar Cell.
Final Report.
D. Bonnet. Dec 79, 87p BMFT-FB-T-79-72, ISSN-0340-7608
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A project aimed at developing a CdSe MIS thin film solar cell was conducted. Fourteen materials were studied with regard to their suitability as I-layers. Two of these compounds, i.e., ZnSe and SbSe, were found to result in cells with relatively high photovoltage and high photocurrent. The preparation procedure for 2 micron thick active CdSe film was optimized with respect to all essential parameters. Commercial, nominally very pure CdSe material from six manufacturers was found either to be unsuited or to lead to properties greatly varying from batch to batch. The best reproducible results were obtained with a material directly synthesized from elements which are commercially available in highly pure form. Tests show that experimental cells achieve efficiencies of 4.5%. Short circuit densities of more than 25 mA/cu cm, given incident solar radiation of 100 mW/cu cm, and open circuit voltages around 600 mV are realized. Further enhancement of the photovoltage up to 700 or 800 mV seems possibly by suitable doping of the CdSe layer and compensation of the doping near the surface. This as well as an enhancement of the fill factor from 55% to 70% could increase the cell efficiency to 9 or 10%.

ORNL/TM-7228 PC **A07**/MF **A01**
Oak Ridge National Lab., TN.
Analysis of Environmental Issues Related to Small-Scale Hydroelectric Development. I. Dredging.
J. M. Loar, L. L. Dye, R. R. Turner, and S. G. Hildebrand. Jul 80, 118p
Contract W-7405-ENG-26

The small hydroelectric potential (less than or equal to 15-MW capacity) at existing dams in the US has been estimated to be approximately 5000 MW. Development of this resource by retrofitting these dams for hydroelectric generation may require dredging in order to (1) reclaim reservoir storage capacity lost as a result of sediment accumulation; (2) clear intake structures; and/or (3) construct/repair powerhouses, tailraces, and headraces. Dredging and disposal of dredged material at small-scale hydro sites may result in several potential environmental impacts, and their magnitude will depend upon many site-specific factors. The physical and chemical effects of dredging and disposal, their causes, and the biological effects engendered by these physical and chemical changes are discussed. Factors that could affect the severity (magnitude) of these effects (impacts) are emphasized, with the intent of providing guidance to developers of potential sites. A discussion of environmental contraints and mitigation, as well as guidelines for the early evaluation of the environmental feasibility of dredging, are included. A general introduction is provided on dredging equipment and disposal practices, with emphasis on those practices that would be applicable to small reservoirs. Regulations applicable to dredged material disposal and wetlands protection are discussed, and a preliminary analysis of the economic costs associated with dredging and disposal is presented. (ERA citation 05:030362)

PATENT-4 164 849

Not available NTIS

Department of Energy, Washington, DC.

Method and Apparatus for Thermal Power Generation.

Patent,

J. D. Mangus. Filed 30 Sep 76, patented 21 Aug 79, 8p PAT-APPL-728 478

Supersedes PAT-APPL-728 478-76.

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method is described for power generation from a recirculating superheat-reheat circuit with multiple expansion stages which alleviates complex control systems and minimizes thermal cycling of system components, particularly the reheater. The invention includes preheating cold reheat fluid from the first expansion stage prior to its entering the reheater with fluid from the evaporator or drum component. (ERA citation 05:032258)

PATENT-4 200 831

Not available NTIS

Department of Energy, Washington, DC.

Compensated Pulsed Alternator.

Patent,

W. F. Weldon, M. D. Driga, and H. H. Woodson. Filed 3 Aug 78, patented 29 Apr 80, 6p PAT-APPL-930 616

Supersedes PAT-APPL-930 616-78.

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to an electromechanical energy converter with inertial energy storage. The device, a single phase, two or multi-pole alternator with stationary field coils, and a rotating armature is provided. The rotor itself may be of laminated steel for slower pulses or for faster pulses should be nonmagnetic and electrically nonconductive in order to allow rapid penetration of the field as the armature coil rotates. The armature coil comprises a plurality of power generating conductors mounted on the rotor. The alternator may also include a stationary or counterrotating compensating coil to increase the output voltage thereof and to reduce the internal impedance of the alternator at the moment of peak output. As the machine voltage rises sinusoidally, an external trigger switch is adapted to be closed at the appropriate time to create the desired output current from said alternator to an external load circuit, and as the output current passes through zero a self-commutating effect is provided to allow the switch to disconnect the generator from the external circuit. (ERA citation 05:031381)

PB80-225048 PC **A23**/MF **A01**

Environmental Protection Agency, Atlanta, GA. Region IV.

Florida Power Corporation Crystal River Units 4 and 5. Technical Support Documents. Volume I.

Draft rept.

Sep 80, 541p EPA-904/9-80-048a

See also Volume II, PB80-225055.

Florida Power Corporation Proposes to construct and operate two 695 MW (Gross) capacity coal-fired electric generating plants at the existing Crystal River complex in northwest Citrus County, Florida. This EIS examines project alternatives, impacts and mitigative measures related to groundwater, air, surface water, ecological, and socioeconomic and cultural systems.

PB80-225055 PC **A20**/MF **A01**

Environmental Protection Agency, Atlanta, GA. Region IV.

Florida Power Corporation Crystal River Units 4 and 5. Technical Support Documents. Volume II.

Draft rept.

Sep 80, 454p EPA-904/9-80-048b

See also Volume I, PB80-225048.

Florida Power Corporation Proposes to construct and operate two 695 MW (Gross) capacity coal-fired electric generating plants at the existing Crystal River Complex in Northwest Citrus County, Florida. This EIS examines project alternatives; impacts and mitigative measures related to groundwater, air, surface water, ecological, and socioeconomic and cultural systems.

PB80-225360 PC **A06**/MF **A01**

Texas Tech Univ., Lubbock. Water Resources Center.

Feasibility Study to Determine the Practicality of Using Potable Municipal Water Supplies as a Source of Condenser Cooling Water for Power Generating Facilities.

Final rept.,

Ralph H. Ramsey, III, Robert D. Bowersock, Lloyd V. Urban, James H. Strickland, and Robert M. Sweazy. Aug 80, 118p WRC-80-1, W80-06563, OWRT-B-226-TEX(1)

Contract DI-14-34-001-9135

The feasibility of using potable municipal water supplies prior to treatment, as condenser cooling water for an energy generation facility is discussed. The raw water would be drawn from the supply source, stored, and used for the once-through cooling system. The discharged warm water would be placed in a storage pond where it would be drawn, treated, and distributed to water consumers in the system. Potential benefits may be realized by reducing capital investment, warming the water to enhance the effect of water treatment, and increasing access to an additional water source. Laboratory experiments simulating water treatment operations using alum and bentonite at various temperatures indicated that viscosity plays an important role in sedimentation. A reduction in the amount of energy required for heating water is possible and the increased solids settling performance will reduce the capital and amortization costs for water treatment facilities. Any unfavorable environmental impact caused by elevated water temperatures can be minimized through design and management considerations.

PB80-814064 PC **N01**/MF **N01**

National Technical Information Service, Springfield, VA.

Electric Power Consumption. 1970-June, 1980 (Citations from the Engineering Index Data Base).

Rept. for 1970-Jun 80,

Audrey S. Hundemann. Oct 80, 321p

Supersedes NTIS/PS-79/0775 and NTIS/PS-78/0646.

Citations from worldwide research on electric power consumption in the commercial, residential and industrial sectors of the U.S. and many foreign countries are presented. Topic areas cover methods of forecasting electric power demand, computerized load control, and trends in electric power consumption. A few abstracts pertain to the economics of supply and conservation measures. (This updated bibliography contains 313 citations, 50 of which are new entries to the previous edition.)

PB80-814072 PC **N01**/MF **N01**

National Technical Information Service, Springfield, VA.

Electric Power Consumption. 1977-June, 1980 (Citations from the NTIS Data Base).

Rept. for 1977-Jun 80,

Audrey S. Hundemann. Oct 80, 218p

Supersedes NTIS/PS-79/0774 and NTIS/PS-78/0645. Updates COM-74-11102. See also 1971-1976, NTIS/PS-78/0644.

Citations from Federally-funded research dealing with industrial, commercial, and residential aspects of electric power consumption and demand are presented. Topic areas cover the economics of supply as well as amount of consumption. A few citations cover projections of future demand and conservation measures to reduce electric power consumption. (This updated bibliography contains 210 citations, 38 of which are new entries to the previous edition.)

PB80-851991 PC **N01**/MF **N01**

New England Research Application Center, Storrs, CT.

Low Cost Solar Cells. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).

Rept. for Jun 74-May 80,

Walter Van Put. Jun 80, 66p NERACIAANT0682

Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the manufacturing cost analysis, practicality, and economic viability of low-cost silicon solar cell production techniques. Citations describe near-term technology for processes such as silicon ribbon growth, deformation, deposition, rheotaxy, recrystallization, and spray deposited films for silicon, alloys, and photovoltaic substrates, with emphasis on energy conversion efficiency. (Contains 054 citations.)

PB80-853963 PC **N01**/MF **N01**

New England Research Application Center, Storrs, CT.

Tide Power. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).

Rept. for Jan 74-May 80,

John H. Frey. Jun 80, 56p NERACIAANT0756

Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the harnessing of power from waves, currents and tides. Both technical information and economic evaluations are included in this retrospective bibliography. (Contains 046 citations.)

PNL-4000(V.2) PC **A13**/MF **A01**

Battelle Pacific Northwest Labs., Richland, WA.

Assessment of Solar Options for Small Power Systems Applications. Volume II. Identification and Characterization of Concepts for Analysis.

W. W. Laity, D. T. Aase, W. J. Apley, S. P. Bird, and M. K. Drost. Jun 80, 300p

Contract AC06-76RL01830

The primary purpose of this study is to provide DOE with an independent, objective assessment of the principal solar thermal conversion concepts that have the potential for achieving commercial success as small electric power sytems in the 1- to 10-MWe range. Seven generic types of collectors, together with associated subsystems for electric power generation, were considered in this study. The collectors can be classified into three categories: (1) two-axis tracking (with compound curvature reflecting surfaces); (2) one-axis tracking (with single-curvature reflecting surfaces); and (3) nontracking (with low-concentration reflecting surfaces). These collectors can be combined with energy transport, energy storage, and power conversion subsystems in a wide variety of ways to formulate conceptual systems for electric power generation. In this study, attention was restricted to configurations that are potentially suitable for development as small power systems (1 to 10 MWe) in the long term (1990 to 2000), with initial

commercialization by the mid-1980s. Cogeneration and total energy systems were beyond the scope of this study. All seven types of collectors were analyzed in conceptual system configurations with Rankine-cycle engines. Because they can operate at particularly high concentration ratios, two of the collectors (the Point Focus Central Receiver and the Point Focus Distributed Receiver) were also analyzed with Brayton-cycle engines. In addition, the latter of the two was analyzed with Stirling-cycle engines. With these engine options, 10 conceptual systems were formulated for analysis. Results are presented in detail. (ERA citation 05:030428)

SAN-1108-76-8(V.7) PC **A14**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Central Receiver Solar Thermal Power System, Phase 1: CDRL Item 2, Pilot Plant Preliminary Design Report. Volume VII. Pilot Plant Cost and Commercial Plant Cost and Performance.
R. W. Hallet, Jr., and R. L. Gervais. May 80, 306p MDC-G-8776(V.7)
Contract EY-76-C-03-1108

Detailed cost and performance data for the proposed tower focus pilot plant and commercial plant are given. The baseline central receiver concept defined by the MDAC team consists of the following features: (A) an external receiver mounted on a tower, and located in a 360 exp 0 array of sun-tracking heliostats which comprise the collector subsystem. (B) feedwater from the electrical power generation subsystem is pumped through a riser to the receiver, where the feedwater is converted to superheated steam in a single pass through the tubes of the receiver panels. (C) The steam from the receiver is routed through a downcomer to the ground and introduced to a turbine directly for expansion and generation of electricity, and/or to a thermal storage subsystem, where the steam is condensed in charging heat exchangers to heat a dual-medium oil and rock thermal storage unit (TSU). (D) Extended operation after daylight hours is facilitated by discharging the TSU to generate steam for feeding the admission port of the turbine. (E) Overall control of the system is provided by a master control unit, which handles the interactions between subsystems that take place during startup, shutdown, and transitions between operating modes. (ERA citation 05:030433)

SAN-1110-8(V.7) PC **A07**/MF **A01**
Martin Marietta Corp., Denver, CO.
Central Receiver Solar Thermal Power System, Phase 1. Pilot Plant Cost and Commercial Plant Cost and Performance Preliminary Design Report.
1977, 148p MCR-77-156(V.7)
Contract EY-76-C-03-1110

Detailed cost and performance data for the 10 MWe Pilot Plant and the 150 MWe Commercial Plant are given. The Commercial Plant consists of 15 integrated collector - receiver modules. Each module contains 1325 heliostats and an internally mounted steam-generating receiver on a steel tower with an aperture height of 90 M. The Pilot Plant consists of one full-scale collector - receiver module. The two-stage sensible heat storage system utilizes a heat transfer salt medium and a hydrocarbon oil storage medium. The electric power generation system uses a conventional steam turbine-generator. The Pilot Plant is one module of the Commercial Plant, providing for one-to-one scaling in the most critical areas. (ERA citation 05:030434)

SAN-1483-1/4 PC **A07**/MF **A01**
Rockwell International, Canoga Park, CA.
Conceptual Design of Advanced Central Receiver Power Systems Sodium-Cooled Receiver Concept: Development Plan and Pilot Plant Description. Final Report.
Mar 79, 147p ESG-79-2(V.3)
Contract EG-77-C-03-1483

This volume encompasses Task 6 of the Phase I effort on the Advanced Central Receiver. This task included developing a plan to bring the commercial plant conceptual design into being. The base version of the plan includes a pilot plant to be designed and constructed during Phases II and III, three subsystem research experiments to be performed during Phase II, and the design and construction of a commercial demonstration plant. These plans are discussed in detail, as well as several options which could reduce both cost and schedule to achieve the overall goal of a commercial-sized demonstration plant. In evaluating pilot plant characeristics, emphasis was placed on representing commercial plant receiver characteristics and total system operation. In considering total system operation, it was recognized that a water-steam pilot plant would already be in operation, hence certain systems will already have been tested. Several receiver configurations were investigated consisting of from one to five full-size panels, with the objective of representing peak north side power for a 100-MWe plant as well as the peak flux vaue of about 1.4 MW/m exp 2 . This goal was accomplished with a 5-panel receiver; however, the power to the edge panels is very low. Hence, with little loss, these panels can be eliminated to give a 3-panel configuration. The total absorbed thermal power is about 38 MWt, which is sufficient for about 10 MWe. A plant of this size is described. (ERA citation 05:030435)

SAN-1570-2/3 PC **A21**/MF **A01**
TRW Systems and Energy Group, Redondo Beach, CA.
Power System Development: Ocean Thermal Energy Conversion (OTEC). Preliminary Design Report: Appendices, Part 2 (Final).
4 Dec 78, 494p
Contract EG-77-C-03-1570

The objective of this project is the development of a preliminary design for a full-sized, closed cycle, ammonia power system module for the 100 MWe OTEC demonstration plant. In turn, this demonstration plant is to demonstrate, by 1984, the operation and performance of an Ocean Thermal Power Plant having sufficiently advanced heat exchanger design to project economic viability for commercial utilization in the late 1980's and beyond. Included in this power system development are the preliminary designs for a proof-of-concept pilot plant and test article heat exchangers which are scaled in such a manner as to support a logically sequential, relatively low-cost development of the full-scale power system module. The conceptual designs are presented for the demonstration plant power module, the proof-of-concept pilot plant, and for a pair of test article heat exchangers. Costs associated with the design, development, fabrication, checkout, delivery, installation, and operation are included. The accompanying design and producibilty studies on the full-scale power system module project the performance/economics for the commercial plant. This section of the report contains appendices on the electrical system, instrumentation and control, ammonia pump evaluation study, ammonia and nitrogen support subsystems, piping and support design calculations, and plant availability. (ERA citation 05:030472)

SAN-1726-1(V.2) PC **A99**/MF **A01**
Boeing Engineering and Construction, Seattle, WA.
Closed Brayton Cycle Advanced Central Receiver Solar-Electric Power System. Volume II. Evaluation, Selection, Conceptual Design, and Assessment of a Closed Brayton Cycle Advanced Central Receiver Solar-Electric Power Plant with Coupled Sensible Heat Storage. Final Report, September 30, 1977-November 30, 1978.
W. S. Davidson, C. E. Kercher, B. W. Knutson, A. E. Kofal, and D. F. Plummer. Nov 78, 603p
Contract EG-77-C-03-1726

The performance and design requirements for one type of terrestrial solar thermal electric power system are described. Each of the system's major subsystems are analyzed in terms of concept and performance. The method of selecting the preferred commercial-scale system is described. The preferred commercial system conceptual design is described, and its technical and cost performance evaluated. Comments on the preferred commercial system from certain electric utilities are summarized. Finally, potential improvements to improve the performance and reduce the capital cost of the system are reviewed, and possible limitations to the development of the system are examined. Appendices provide details on certain analytic techniques, cost and performance data. (ERA citation 05:030436)

SAND-79-7053 PC **A12**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Low Cost Photovoltaic Concentrator Array: A Novel Design Utilizing Glass-Reinforced Concrete.
J. R. Taylor. Jun 80, 272p
Contract AC04-76DP00789

MBAssociates (MBA) has designed and built a prototype of a Low Cost Photovoltaic Concentrator Array. This array features the development of a two-axis tracking system which is designed to support high concentration point-focus collectors (up to 400 suns). In addition to the cost advantages of reducing the expensive cell area in a high concentration Fresnel lens collector system, this array consists primarily of spray-molded glass-reinforced concrete (GRC) as the low-cost structural material that most advantageously meets system rigidity requirements. Another innovation consists of using a GRC spherical module support structure which floats in an aqueous lubricant and serves as a spherical bearing about which the system turns. This large spherical bearing distributes loads without the use of expensive precision parts. The only precision components are two gear-head motors used to drive the sphere in two axis of motion. A 3/8-scale model tracking system and a full-scale high concentration (100 x solar, 80 x geometric) prototype collector module were built during this program. Detailed design, performance, and cost data are presented. (ERA citation 05:030387)

SAND-80-1639C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Modal Testing of the Vertical Axis Wind Turbine.
D. E. Miller, and A. R. Nord. 1980, 23p CONF-800746-1
Contract AC04-76DP00789
Engineering foundation conference, Rindge, NH, USA, 27 Jul 1980.

The VAWT is a 17-meter structure which has been tested in a variety of configurations. Early in the program there were three fiberglass blades reinforced with struts. A later configuration had two aluminum blades. Both of these have been tested by the modal analysis group. There is also a three-bladed aluminum structure which will be tested in the coming months. Test results are presented. (ERA citation 05:030587)

SAND-80-7015 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Vertical Axis Wind Turbine Foundation Parameter Study.
P. F. Lodde. Jul 80, 38p
Contract AC04-76DP00789

The dynamic failure criterion governing the dimensions of prototype Vertical Axis Wind Turbine Foundations is treated as a variable parameter. The resulting change in foundation dimensions and costs is examined. (ERA citation 05:030588)

SAND-80-8180 PC **A09**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Electric Power Generating Subsystem Study for Advanced Water/Steam Receivers. Final Technical Report.
G. Oganowski, and D. J. Muller. Apr 80, 176p
Contract AC04-76DP00789

The objective of this particular program was to evaluate the performance and economics of a range of 1985-vintage Rankine power conversion cycles for advanced water/steam solar plant application. The program output provides sufficient information for selection of the optimum power conversion cycle when integrated with other advanced water/steam solar plant systems being developed under separate Sandia contracts. The major program efforts included: cycle screening, performance analysis, and cost analysis. Each of these efforts is described in detail. A wide range of turbine cycle options was evaluated for thermodynamic performance to enable selection of cycles for detailed analysis. Cycles evaluated in the screening study included: nonreheat cycles, solar reheat

cycles, and steam reheat cycles. The turbine cycle/thermal storage subsystem combinations selected in the screening process were analyzed in detail over a range of nominal power outputs and throttle conditions. Trade-off studies were performed in several areas to optimize the performance of the nonreheat and reheat cycle configurations. Trade-off studies were performed in the following areas: storage subsystem pressure, number of feedwater heaters functioning during storage operation, casing configurations, single versus dual stage storage, and storage discharge flow rate. The trade-off studies resulted in cycle configurations which were analyzed by a detailed turbine analysis computer code which produced estimates of cycle performance.These results are presented. The costs of the equipment were determined for the selected turbine cycles, including the turbine-generator equipment from the inlet nozzles to the generator busbar together with the support equipment necessary to enable the turbine and generator to function. (ERA citation 05:030437)

SAND-80-8505 PC **A15/MF A01**
Sandia Labs., Albuquerque, NM.
Department of Energy Large Solar Central Power Systems Semiannual Review.
Jun 80, 350p
Contract AC04-76DP00789

Separate abstracts were prepared for the 37 papers presented. (ERA citation 05:030430)

SERI/PR-0-8276-1 PC **A03/MF A01**
RCA Labs., Princeton, NJ.
Thin-Film Polycrystalline Silicon Solar Cells. Technical Progress Quarterly Report No. 1, September 25-December 24, 1979.
B. W. Faughnan, J. Blanc, W. Phillips, and D. Redfield. Jan 80, 39p
Contract EG-77-C-01-4042

The laser scanner has been improved in resolution and convenience of operation. The analysis of grain-boundary laser-photoresponse line shape at lambda = 1.5 mu m yields a value for the grain boundary surface recombination velocity, i.e., s = 1.0 x 10 exp 4 cm/s. New experiments are underway in: (1) deep-level spectroscopy, where a sample is being fabricated with a grain boundary level spectroscopy, where a sample is being fabricated with a grain boundary parallel to the surface; (2) liquid-crystal technique for measuring grain boundaries, by improving the electrical contacts to the sample; and (3) electron channeling patterns, by examining grains which have been previously laser-scanned. Hydrogenation experiments on phosphorus-diffused Wacker Silso solar cells yield negative results even when grain-boundary activity is monitored by the sensitive laser scanning method. Experiments are planned on bare silicon by a laser-scan-photoconductivity technique. Phosphorus diffusion down grain boundaries has been observed by bevel and stain experiments on a variety of diffused and implanted junctions in the temperature range of 750 exp 0 to 950 exp 0 C. Diffusion spike lengths vary from 1/3 to 1 1/2 times the junction depth, and between 25 to 75% of the grain boundaries show these spikes. Laser scanning experiments show that grain boundaries with diffusion spikes are not electrically active. A new series of bicyrstals was begun with a <110> growth direction. So far, a crystal with a 30 exp 0 misorientation has been successfully grown. (ERA citation 05:030388)

SERI/PR-0-8276-2 PC **A03/MF A01**
RCA Labs., Princeton, NJ.
Thin-Film Polycrystalline Silicon Solar Cells. Technical Progress Quarterly Report No. 2.
B. W. Faughnan, J. Blanc, W. Phillips, and D. Redfield. Jun 80, 36p
Contract AC02-77CH00178

A continuing study of the characterization of grain boundaries in polycrystalline silicon is reported. The solar cells fabricated in this quarter, which include a complete set of bicrystals and cells made on two different types of potentially low-cost substrates, are listed. Some detailed QE measurements on a Wacker Silso cell are described and the difference between bulk and average diffusion length is explained. It is shown how the average QE curve can be used to calculate the AM-1 short-circuit current with excellent accuracy. The laser scanner has been improved further and excellent scans are obtained at wavelengths of 633 nm and 1150 nm. These are discussed along with a new photoconductivity-laser-scan technique for observing grain boundaries in bare silicon, i.e., with no diffused junction. Recent developments in other grain boundary characterization techniques are described. These include the liquid-crystal technique for observing grain boundaries, the use of a bicrystal with grain boundary parallel to the sample surface for DLTS measurements, and the measurement of grain crystallographic orientation by electron-channeling patterns in a previously laser-scanned sample of Wacker Silso silicon. (ERA citation 05:030389)

SERI/PR-8104-2-T1 PC **A03/MF A01**
Globe-Union, Inc., Milwaukee, WI.
Commercialization of a Thick Film Solar Cell. Quarterly Technical Progress Report, April 1, 1980-June 30, 1980.
1980, 28p
Contract AC02-77CH00178

Samples of screen printed cadmium sulfide were supplied to the Institute of Energy Conversion of the University of Delaware for the application of copper sulfide via the evaporated cuprous chloride technique. Results of this activity are not available at this time. Problems were encountered in reproducing the previously obtained low resistivity cadmium sulfide films. The probable cause of this problem is in the atmosphere control for the furnace. The furnace has been extensively modified. When completed the modifications will permit greater control over the atmosphere, flow rate, and composition. A trial solar cell was prepared. While its short circuit current and open circuit voltage are low, present procedures for applying the currous chloride appear adequate. An attempt was made to apply the cuprous sulfide layer via a screen printed, fired-on copper electrode. The resultant copper electrode lacked adhesion to the cadmium sulfide layer. (ERA citation 05:030390)

SERI/PR-8104-4-T1 PC **A03/MF A01**
Stanford Univ., CA.
Low-Cost Process for P-N Junction-Type Solar Cell.
J. B. Mooney, R. H. Lamoreaux, and C. W. Bates, Jr. Jun 80, 38p
Contract AC02-77CH00178

CuInSe sub 2 films have been deposited by spray pyrolysis. Thermodynamic studies show that the preparation of single-phase stoichiometric films is less probable than the analogous CuInS sub 2 , owing to the relative ease of dissociation of H sub 2 Se. Examination of films by optical absorption verifies these predictions. A heterojunction of glass/SnO sub 2 (Sb)/n-CdS/p-CdS/p-CuInSe sub 2 Au configuration exhibited the photovoltaic effect with low efficiency but without the cracking that resulted with the CuInS sub 2 devices. Two sintered n-CdS/p-CdTe devices exhibited photovoltaic effect with low efficiency. The resistivity of the CdS films has been reduced to 2 OMEGA-cm. (ERA citation 05:030391)

SERI/PR-8119-1-T1 PC **A03/MF A01**
Honeywell Corporate Material Sciences Center, Bloomington, MN.
Supported Growth of Polycrystalline Silicon Sheet on Low-Cost Ceramic, Carbon, or Reusable Substrate. Quarterly Report No. 3, 1 April-30 June 1980.
P. W. Chapman, J. D. Heaps, S. B. Schuldt, and J. D. Zook. 31 Jul 80, 34p
Contract AC02-77CH00178

The overall objective of this program is to identify and develop high-throughput, supported-growth method for producing low-cost, large-area polycrystalline silicon sheet on ceramic, carbon, or reusable substrates. The growth methods being investigated are SCIM-coating and top-coating techniques. SCIM is an acronym for Silicon Coating by Inverted Meniscus. With this technique, a low-cost ceramic substrate is silicon-coated in a continuous manner by passing the substrate over a molten-silicon meniscus which is contained in a narrow fused-silica trough. Asymmetric (fast) growth modes are also being thermally analyzed and experimentally investigated using the SCIM method to improve the coating throughput and hence the cost-effectiveness of the continuous-coating process. With the top-coating technique, molten silicon is metered onto the top carbonized surface of a moving substrate. This technique also has the potential for being a fast-thoughput method, since the thickness of the silicon coating is dictated by the quantity of molten silicon metered onto the substrate rather than the coating rate, as is the case in the SCIM technique. Progress during the past quarter is summarized. (ERA citation 05:030392)

SERI/PR-8278-1-T1 PC **A04/MF A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Vacuum Deposited Polycrystalline Silicon Films for Solar Cell Applications. Quarterly Report, September 15-December 31, 1979.
C. Feldman, C. H. Arrington, , N. A. Blum, and F. G. Satkiewicz. Mar 80, 60p
Contract AC02-77CH00178

Polycrystalline silicon films 14-22 mu m thick and with average grain diameters of 20-40 mu m were deposited by vacuum deposition onto both ceramic and sapphire substrates which were previously coated with a thin (1-2 mu m) TiB sub 2 conducting layer. The large grains are the result of an interaction in the initial growth stages between silicon and TiB sub 2 . SIMS studies of B/Ti/Al sub 2 O sub 3 , B/Al sub 2 O sub 3 , and Ti/Al sub 2 O sub 3 , interactions are reported as part of a continuing investigation of TiB sub 2 formation and silicon interactions on the TiB sub 2 surface. The increase in grain size has led to an improvement in the open-circuit voltage V/sub oc/, but not to an increase in the short-circuit current J/sub sc/. Capacitance-voltage measurements give results characteristic of an abrupt junction and a build-in voltage V/sub D/ consistent with the measured doping levels. A simple method for measuring the minority carrier diffusion length in the base region L/sub n/ is described. The measurements indicate that there is little change in L/sub n/ between large (20-40 mu m) and small (approx. 5 mu m) grained samples. (ERA citation 05:030395)

SERI/PR-8278-1-T2 PC **A04/MF A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Vacuum Deposited Polycrystalline Silicon Films for Solar Cell Applications. Second Quarterly Technical Progress Report. January 1-March 31, 1980.
C. Feldman, C. H. Arlington, III, N. A. Blum, and F. G. Satkiewicz. May 80, 55p
Contract AC02-77CH00178

A careful study of a specially formed thin silicon layer on TiB sub 2 -coated sapphire reveals that the interaction layer of TiSi sub 2 is composed of larger grains. Processing steps were developed which lead closer to the goal of fabricating polycrystalline silicon photovoltaic devices completely by vacuum deposition. Both n-type and p-type silicon are now being deposited. New deposition masks were made for depositing the n-regions upon the p-layers. New electrode deposition masks were also made for a direct electroding process to replace the photolithographic process used previously. The TiB sub 2 bottom electrode fabrication has been achieved in a single vacuum chamber. Reaction constants and activation energy for TiB sub 2 layer formation were determined to be less than those reported by other authors for bulk material. Studies of crystallite growth and interfacial interactions have continued. Major sources of undesirable impurities have been identified and removed from the vacuum chambers. The changes made this quarter have not been incorporated into a completed photovoltaic device. (ERA citation 05:030396)

SERI/PR-9075-1-T1 PC **A03/MF A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
Materials Studies Related to the Cu sub 2 S/ZNCdS Heterojunction. First Quarter Report, March 15, 1980-June 15, 1980.
L. C. Burton. Jul 80, 34p
Contract AC02-77CH00178

Work over the first quarter was directed toward compositional measurements of Cu sub 2 S/ZnCdS junctions by AAS and AES, and modelling

of the junction based on these measurements. AAS and AES measurements both indicate an accumulation of Zn under the interface. AES profiles indicate Zn and Cd in the Cu sub 2 S, although AAS indicates concentrations below 5 x 10 exp 19 cm exp -3 . A model based on lateral composition variation at the interface is presented. This model can account for some of the trends seen in Cu sub 2 S/ZnCdS cells, especially the decrease in short circuit current at higher Zn compositions. (ERA citation 05:030397)

SERI/TP-351-545 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Planning for Electric Utility Solar Applications: The Effects on Reliability and Production Cost Estimates of the Variability in Demand.
G. R. Fegan, and C. D. Percival. Jan 80, 14p
CONF-800804-18
Contract AC02-76CH00178
ASME century 2 emerging technology conference, San Francisco, CA, USA, 10 Aug 1980.

Previous studies have shown the necessity of the consideration of hourly variability in the output from the intermittent generation source. However, the studies did not take into account the variability in the demand. A result is presented which shows that under general conditions the variability due to randomness can be ignored except in the neighborhood of the peak and minimum demands. (ERA citation 05:027189)

SERI/TR-80959-1 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC.
Standards for Photovoltaic Energy Conversion Systems. Final Report.
H. A. Schafft. Apr 80, 19p
Contract EG-77-C-01-4042

This report provides the results of a search for existing domestic standards and related documents for possible application in the development of a standards base for photovoltaic energy conversion systems. The search resulted in locating about 150 test methods, recommended practices, standards, solar-thermal performance criteria, and other standards-related documents. They are listed by topic areas in the appendix. The listing was prepared to assist those involved in developing performance criteria for photovoltaic systems and in identifying methods to test system performance against these criteria. It is clear from the results of the search that few standards are directly applicable to terrestrial solar photovoltaic systems and that much standards development is required to support the commercialization of such systems. (ERA citation 05:030425)

SERI/TR-98003-05 PC **A11**/MF **A01**
Washington Univ. Technology Associates, St. Louis, MO.
Definitive Generic Study for Sailwing Wind Energy Systems. Non-Technical Summary Report. Final Report.
K. H. Hohenemser, A. H. P. Swift, and D. A. Peters. Oct 79, 247p SERI/TR-8003-02, SERI/SP-8003-01
Contract EG-77-C-01-4042

Information is presented concerning the aerodynamics of sailwings; tests with sailwing model rotors; performance and initial cost optimization of sailwing wind machines; structural integrity and durability of rotary sailwings; dynamics of sailwing wind machines; configurations of sailwing machines; potential improvements of rotary sailwings; and cost effectiveness of sailwing wind machines. (ERA citation 05:030591)

SERI/TR-98003-1 PC **A04**/MF **A01**
AeroVironment, Inc., Pasadena, CA.
Definitive Generic Study of Augmented Horizontal Axis Wind Energy Systems. Executive Summary. Final Report.
P. B. S. Lissaman, B. Hibbs, S. N. Walker, and T. Zambrano. Apr 79, 75p
Contract EG-77-C-01-4042

A method of increasing the power output of a wind turbine is to add an augmentor system which will act like a converging duct to increase the velocity at the turbine disk and thus increase the energy flux through the power extraction device. The cost-effectiveness of such systems depends upon the trade-off between the additional energy output and the added cost of the augmentor system. The report studies the cost-effectiveness of three different types of augmentors. (ERA citation 05:030589)

SERI/TR-98003-3 PC **A05**/MF **A01**
Tetra Tech, Inc., Arlington, VA.
Augmented Horizontal Axis Wind Energy Systems Assessment. Executive Summary. Final Report.
Dec 79, 94p
Contract EG-77-C-01-4042

Three horizontal axis augmented systems are critically examined, and the technical status, performance characteristics, and cost projections of these systems are evaluated. The purpose of the study is to determine whether these systems have the potential to be a cost effective energy resource. This assessment should provide guidance and direction for future programmatic efforts in the WEIS program. Although it is not meant to provide an exhaustive study of all aspects of these systems, the current status of horizontal axis augmented systems has been examined. (ERA citation 05:030590)

SERI/TR-98146-1 PC **A06**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Materials Analysis Methods for Examination of Solar Cells. Final Report.
C. N. Wilson. Mar 80, 111p
Contract EG-77-C-01-4042

Photovoltaic device performance depends on properties of thin-surface and near-surface layers of solid-state materials. Cell structures being investigated by SERI subcontractors for solar cells typically involve one or more thin-film layers of semiconducting material. The chemical and physical structure of these layered material systems affects photovoltaic cell performances. In particular, the composition, abruptness, and chemical nature of layer interfaces are important. Also of interest is the degree of crystallinity, grain size and orientation, and the physical nature of grain boundaries within the various layers. Comprehensive examination of the structure and chemistry of photovoltaic materials requires application of several analysis methods. The objectives of this report are: (1) to describe the materials analysis techniques available to SERI through the HEDL contract, and (2) to provide a user's guide to SERI and SERI contractors to guide them in the use of these materials analysis services. Some general considerations concerning materials analysis classification are discussed in this report, and the applications and capabilities of specific techniques are summarized in the tables. Eight techniques having high potential for characterization of photovoltaic materials are briefly described. These eight techniques are: AES, IMMA, Electron Microscopy, EPMA, XRF, XRD, SSMS and NAA. (ERA citation 05:030398)

10C. Energy Storage

AD-A087 753/0 PC **A06**/MF **A01**
Naval Research Lab Washington DC
Energy Storage As Heat-of-Fusion In Containerized Salts.
Memorandum rept.,
T. A. Chubb, J. J. Nemecek, and D. E. Simmons. 27 Jun 80, 110p NRL-MR-4267, AD-E000 495
Contract DOE-EC-77-A-31-1024

This report is concerned with energy storage based on heat-of-fusion in contanerized salt. The 'energy storage boiler tank' uses evaporation and condensation of a heat transfer fluid to provide heat transfer into and out of stacked cans of salt. The 'energy storage superheater tank' uses a network of alkali metal heat pipes to distribute heat throughout a building filled with salt cans. It uses a radiation to transfer energy to and from stacked cans of salt. The paper summarizes the rationale for energy storage in containerized salt, it discusses salt availability, salt processing, container requirements, can technology and heat transfer fluid degradation problems. These discussions lead to estimates of energy storage system costs. The Naval Research Laboratory is building a 2 MWht proof-of-concept energy storage boiler tank. Laboratory investigations studying the compatibility of the heat transfer fluid with the molten storage salt are described, along with measurements of temperature drops associated with the energy input process. An assessment of the current status of the energy storage boiler tank is presented. (Author)

ANL/ES-90 PC **A15**/MF **A01**
Argonne National Lab., IL.
Ecological and Biomedical Effects of Effluents from Near-Term Electric Vehicle Storage Battery Cycles.
May 80, 333p
Contract W-31-109-ENG-38

An assessment of the ecological and biomedical effects due to commercialization of storage batteries for electric and hybrid vehicles is given. It deals only with the near-term batteries, namely Pb/acid, Ni/Zn, and Ni/Fe, but the complete battery cycle is considered, i.e., mining and milling of raw materials, manufacture of the batteries, cases and covers; use of the batteries in electric vehicles, including the charge-discharge cycles; recycling of spent batteries; and disposal of nonrecyclable components. The gaseous, liquid, and solid emissions from various phases of the battery cycle are identified. The effluent dispersal in the environment is modeled and ecological effects are assessed in terms of biogeochemical cycles. The metabolic and toxic responses by humans and laboratory animals to constituents of the effluents are discussed. Pertinent environmental and health regulations related to the battery industry are summarized and regulatory implications for large-scale storage battery commercialization are discussed. Each of the seven sections were abstracted and indexed individually for EDB/ERA. Additional information is presented in the seven appendixes entitled; growth rate scenario for lead/acid battery development; changes in battery composition during discharge; dispersion of stack and fugitive emissions from battery-related operations; methodology for estimating population exposure to total suspended particulates and SO sub 2 resulting from central power station emissions for the daily battery charging demand of 10,000 electric vehicles; determination of As air emissions from Zn smelting; health effects: research related to EV battery technologies. (ERA citation 05:031116)

ANL-K-79-4917-1 PC **A05**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Evaluation of Superconducting Magnetic Energy Storage.
A. D. Little. Nov 79, 97p
Contract W-31-109-ENG-38

Superconducting magnetic energy storage (SMES) systems differ from other storage systems presently in use, or considered for use, by the electric utility industry, principally because of the radically different technology involved. SMES also has certain unique advantages: it appears to be able to store and deliver energy at very high efficiency, and it can switch from the charge to discharge mode in a few tens of milliseconds. The combination of these two desirable characteristics distinguishes SMES from almost all other energy storage systems. This investigation was undertaken to discover if the nation and the electric utility industry might benefit sufficiently from the use of SMES systems to justify continued research and development support by DOE. At present, systems development is in a relatively early stage, and much component development for many of the major subsystems remains to be performed. It appears each SMES unit will be large and therefore expensive; also that the investment in research and development required to achieve final commercial success may be substantial. (ERA citation 05:030600)

CONF-800324-4 PC **A03**/MF **A01**
Argonne National Lab., IL.
Development of High Temperature Secondary Li-Al/FeS/sub X/ Batteries at Argonne National Laboratory.
J. E. Battles, E. C. Gay, R. K. Steunenberg, and D. L. Barney. 1980, 50p

Contract W-31-109-ENG-38
Seminar on electrochemical systems: batteries and fuel cells, Fortaleza-Ceara, Brazil, 2 Mar 1980.

A general introduction to the battery program is given first. Subsequent sections discuss cell development, results of cell testing, and materials and component development - electrical feedthrough, electrode separators, materials for current collectors, and post-test cell examination (cell failure mechanisms, copper deposition in electrode separators, lithium gradient in negative electrodes). The Mark IA battery developed a short circuit in one of the modules that resulted in complete failure of the module; the other module was unaffected. 10 tables. (ERA citation 05:030733)

CONS-5161-T1 PC **A05**/MF **A01**
Globe-Union, Inc., Milwaukee, WI. Corporate Applied Research Group.
Low-Cost Fabrication of Thin-Walled Solid Electrolyte Tubes from Doctor-Bladed Ceramic Tape.
R. T. Dirstine. 1979, 76p
Contract EM-78-C-01-5161

Sodium beta -Al sub 2 O sub 3 tubes having wall thicknesses of typically 0.4 mm were fabricated from doctor-bladed (cast) ceramic tape by use of proprietary organic slip compositions and zeta-processed, lithia-stabilized alumina power. The ceramic tubes fabricated from cast tape had low porosity, low resistivity (approx. 4 ohm-cm at 300 exp 0 C), and good mechanical strength. Alternative fabrication techniques for manufacture of tubes from tape were evaluated, and the primary processing requirements/obstacls were identified. Closed-end tubes, nominally 10 mm outer diameter, 60 mm in length, and with a wall thickness of 0.3 mm, were supplied to the Department of Energy. 26 figures, 10 tables. (ERA citation 05:030740)

COO-4451-3 PC **A03**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Materials Science and Engineering.
Electrolytic Degradation of Lithia-Stabilized beta "-Alumina. Technical Progress Report, April 1, 1979-June 30, 1980.
A. V. Virkar. Jul 80, 49p UTEC-80-100
Contract AS02-77ER04451

Research activities during the period April 1, 1979 to June 30, 1980 are described in the following areas: theoretical development of the model-solution to the Laplace equation for determining the flux of sodium ions to the sodium-filled cracks; determination of crack propagation rates via low-temperature degradation of bar specimens; design and construction of apparatus for wetting studies on beta "-alumina and NASICON; calculation of current concentration near nonwetted areas by the method of Papamichael and Whiteman; testing of effects of bakeout and additives on sodium-sodium cells and design of disc cells; fabrication and testing of NASICON solid electrolyte. Important findings during the present year are as follows: high-temperature bakeout is essential to ensure complete wetting - improved wetting significantly improves performance of cells; ion focusing to a sodium-filled crack is determined by solution of the Laplace equation for appropriate boundary conditions; crack propagation rates are determined by strength measurements after electrolysis; current concentration near nonwetted areas is calculated by the conformal transformation technique of Papamichael and Whiteman. 14 figures, 1 table. (ERA citation 05:030741)

DOE/ET/26931-T1 PC **A06**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Low-Cost Flywheel Demonstration Program. Final Report.
Apr 80, 109p
Contract AC01-77ET26931

The Applied Physics Laboratory/Department of Energy Low Cost Flywheel Demonstration Program was initiated on 1 October 1977 and was successfully concluded on 31 December 19'9. The total cost of this program was $355,190. All primary objectives were successfully achieved as follows: demonstration of a full-size, 1)kWh flywheel having an estimated cost in large-volume production of approximately $50/kWh; developmeNt of a ball-bearing system having losses comparable to the losses in a totally magnetic suspension system; successful and repeated demonstration of the low-cost flywheel in a complete flywheel energy-storage system based on the use of ordinary house voltage and frequency; and application of the experience gained in the hardware program to project the system design into a complete, full-scale, 30-kWh home-type flywheel energy-storage system. (ERA citation 05:027249)

LMSC-D-678426 PC **A10**/MF **A01**
Lockheed Palo Alto Research Labs., CA.
Rechargeable Alkaline Zinc/Ferricyanide Battery. Final Report, 29 September 1978-28 September 1979.
G. B. Adams, R. P. Hollandsworth, and B. D. Webber. 1979, 212p
Contract EM-78-C-01-5163

First-year contract effort was directed primarily to assessing technical and economic feasibility of the alkaline zinc/ferricyanide rechargeable battery for utility load-leveling applications. This battery meets the requirements for this application with cell voltages of 1.94 V on charge and 1.78 V on discharge (35 mA/cm exp 2) at 40 exp 0 C, with peak power density of 4.5 kW/m exp 2 . Mean energy efficiency is 84% at 760 and 86% at 1110 4-hour cycles in full-cell and redox half-cell cycling, respectively. An updated, upgraded economic analysis suggests a battery selling price of $32/kWh, installed price of $230/kW, and footprint of 8.7 kWh/ft exp 2 as realistic goals for a 20-MW, 100-MWh system. A major effort was successfully completed on design, construction, programing, and debugging of a microprocessor-controlled battery cycling system, which is the heart of the cell cycling test facility developed on this project. Other technical areas addressed include electrode substrate evaluation, solubilities and conductivities of zinc oxide and sodium ferro- and ferricyanide in sodium hydroxide electrolytes, mechanism of the slow chemical deligation of alkaline ferricyanide and its reversal, optimal compositions of zincate and iron redox electrolytes, effect of electrolyte flow rate and additions on quality of zinc electrodeposits, cell and electrode design and fabrication, and full and half-cell cyclic testing. Significant technical progress was made in concept configuration and improving performance of the alkaline zine/ferricyanide battery. 71 figures, 12 tables. (ERA citation 05:030793)

N80-29857/3 PC **A11**/MF **A01**
Honeywell, Inc., Minneapolis, MN. Technology Strategy Center.
Active Heat Exchange System Development for Latent Heat Thermal Energy Storage.
Final Report.
R. T. Lefrois, and A. K. Mathur. Apr 80, 226p
NASA-CR-159727, DOE/NASA/0038-80/2
Contract DEN3-38

Five tasks to select, design, fabricate, test and evaluate candidate active heat exchanger modules for future applications to solar and conventional utility power plants were discussed. Alternative mechanizations of active heat exchange concepts were analyzed for use with heat of fusion phase change materials (PCMs) in the temperature range of 250 to 350 C. Twenty-six heat exchange concepts were reviewed, and eight were selected for detailed assessment. Two candidates were selected for small-scale experimentation: a coated tube and shell heat exchanger and a direct contact reflux boiler. A dilute eutectic mixture of sodium nitrate and sodium hydroxide was selected as the PCM from over 50 candidate inorganic salt mixtures. Based on a salt screening process, eight major component salts were selected initially for further evaluation. The most attractive major components in the temperature range of 250 to 350 C appeared to be NaNO3, NaNO2, and NaOH. Sketches of the two active heat exchange concepts selected for test are given.

N80-29858/1 PC **A06**/MF **A01**
Jet Propulsion Lab., Pasadena, CA. Solar Thermal Power Systems.
Electrochemical Energy Storage Systems for Solar Thermal Applications.
S. Krauthamer, and H. Frank. 1 Mar 80, 119p
NASA-CR-163432, JPL-PUB-79-95-REV-1
Contracts NAS7-100, DE-AI01-79ET-20307 Revised.

Existing and advanced electrochemical storage and inversion/conversion systems that may be used with terrestrial solar-thermal power systems are evaluated. The status, cost and performance of existing storage systems are assessed, and the cost, performance, and availability of advanced systems are projected. A prime consideration is the cost of delivered energy from plants utilizing electrochemical storage. Results indicate that the five most attractive electrochemical storage systems are the: iron-chromium redox (NASA LeRC), zinc-bromine (Exxon), sodium-sulfur (Ford), sodium-sulfur (Dow), and zinc-chlorine (EDA).

N80-29860/7 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA. Solar Thermal Power Systems.
High Temperature Thermal Energy Storage in Steel and Sand.
R. H. Turner. 15 Dec 79, 93p NASA-CR-159708, DOE/NASA/0100-79/1
Sponsored by NASA and DOE.

The technical and economic potential for high temperature (343 C, 650 F) thermal energy storage in hollow steel ingots, pipes embedded in concrete, and for pipes buried in sand was evaluated. Because it was determined that concrete would separate from pipes due to thermal stresses, concrete was replaced by sand, which is free from thermal stresses. Variations of the steel ingot concept were not cost effective compared to the sand-pipe approach, therefore, the sand-pipe thermal storage unit (TSU) was evaluated in depth to assess the approximate tube spacing requirements consistent with different system performance characteristics and also attendant system costs. For large TSUs which do not require fast response times, the sand-pipe approach offers attractive possibilities. A pipe diameter about 9 cm (3.5 in) and pipe spacing of approximately 25 cm (10 in), with sand filling the interspaces, appears appropriate. Such a TSU system designed for 8 hours charge/discharge cycle has an energy unit storage cost (CE) of $2.63/kWhr-t and a power unit storage cost (Cp) of $42/kW-t (in 1977 dollars).

N80-29905/0 PC **A07**/MF **A01**
Brown, Boveri und Cie, A.G., Heidelberg (Germany, F.R.). Zentrales Forschungslab.
Development of Sodium Sulfur Batteries.
Final Report.
R. Bauer, W. Fischer, W. Haar, B. Hartmann, and H. Kleinschmager. Dec 79, 126p BMFT-FB-T-79-60, ISSN-0340-7608
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The principal problems in the development of sodium sulfur batteries are essentially solved now that a 10 kWhr experimental battery was tested successfully. Extrapolation of the experimental results permits the conclusion that the properties necessary for application can be defined. The beta-alumina solid electrolyte was optimized with respect to electrical conductivity and lifetime. The sulfur electrode was improved with respect to sulfur utilization and the cathode current collector case with respect to corrosion resistance. Cells of the type being used in an experimental battery (60 to 90 Whr/kg depending on charge/discharge time) were cycled up to 350 times. Capacity declined 3 to 30% during this time, the rate being dependent on casing material. The energy density of cells optimized with respect to weight amounts to about 165 Whr/kg. The first results achieved with the 10 kWh experimental battery are in accordance with results obtained with single cells. Higher energy density, higher lifetime, and better thermal insulation must be achieved.

N80-29908/4 PC **A06**/MF **A01**
Deutsche Automobilgesellschaft m.b.H., Esslingen (Germany, F.R.). Forschungslab.
Nickel Hydrogen Cell Development Centered on Positive Electrodes with High Capacity Per Unit Area for Load Leveling and Traction Applications.
Final Report.
G. Gutmann, and R. Linkohr. Dec 79, 108p
BMFT-FB-T-79-74

Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Scale-up of single cell storage batteries to adapt the system to electric vehicle and load leveling applications was pursued. The development of a low cost Ni/H2 cell making use of positive electrodes of high capacity per unit area (70 to 120 mAhr/cu cm), for orbiting satellites and super to sealed Ni/Cd cells in energy density and reliability is considered. Results from a heat management study reveal that under traction conditions, cell size must be restriced to 120 Ahr. Feasibility of cells with nonhydrophobic negatives together with positives of 100 to 120 mAhr/cu cm was shown experimentally, best performance data being obtained with 2.2 to 2.6 cu cm/Ahr of electrolyte for a one to two hour discharge rate. Results for two 130 Ahr cells show the limits of thermal capability as built; without additional cooling only 87 percent of the capacity of positives inserted can be taken from the cells. An energy density of 47 Whr/kg is demonstrated at the two to five hour discharge rate. Self discharge is found to be about 8 percent per day. According to materials savings and the reduction in number of stack parts achieved by the cell design, costs are cut to about half that of designs now in use.

PB80-857568 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Voltaic Cells. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 11p NERACEI NT0682
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited which cover the properties, progress, and predictions for Voltaic Cells, especially Electrochemical and Solar Cells. Descriptions include functioning and capabilities, such as impedance, power generation and storage, of Voltaic Cells and Electric Batteries. (Contains 157 citations.)

PB80-857576 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Voltaic Cells. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 224p
NERACEDBNT0682
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cites concerning the development, fabrication, and analysis of Voltaic Cells, especially Solar Cells, but including electrochemical and fuel cells. Citations cover such performance characteristics as power generation; energy storage; efficiencies; amperage; voltage; and impedance; reliability; and structure of alloys used in cells and electric batteries. (Contains 164 citations.)

SAND-79-2148 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Performance Data for a Lithium-Silicon/Iron Disulfide, Long-Life, Primary Thermal Battery.
R. K. Quinn, A. R. Baldwin, and J. R. Armijo. Jun 80, 19p
Contract AC04-76DP00789

A 60-minute, 28-volt, 0.5-ampere, primary thermal battery with a volume of 400 cm exp 3 was developed in the Li(Si)/LiCl-KCl/FeS sub 2 electrochemical system. The effects of various simulated environmental tests on the performance of this battery are described. 8 figures, 1 table. (ERA citation 05:030735)

SAND-80-0423 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Aging Study of Li(Si)/FeS sub 2 Thermally Activated Batteries.
J. Q. Searcy, and P. A. Neiswander. May 80, 25p
Contract AC04-76DP00789

A technique for accelerating the aging process of thermally activated batteries that use iron disulfide was developed. In this approach, storage at 130 exp 0 C for one week was assumed equivalent to a shelf life of five years. Some of the batteries stored at 130 exp 0 C were discharged to test for functionality changes, and others were disassembled and carefully analyzed for evidence of deleterious reactions. Some functionality anomalies were observed. The only deleterious reaction observed was that of Li(Si) reacting with water vapor. 3 figures, 6 tables. (ERA citation 05:030738)

UCRL-15242 PC **A03**/MF **A01**
Interplan Corp., Santa Barbara, CA.
Preliminary Energy Use and Economic Analysis of the Aluminum-Air Battery for Automotive Propulsion.
C. L. Hudson, and E. S. Putnam. Apr 80, 45p
Contract W-7405-ENG-48

The first attempt to conduct an overall analysis of the potential capital and life-cycle costs and energy efficiency of a passenger vehicle powered by an aluminum-air battery is presented. Hydrated alumina is the principal reaction product. Estimates of the operating characteristics of the vehicle were made on the basis of laboratory test results, performance-simulation-model test results, and hypotheses on the refueling. The LLL performance simulation model provided input data to the analysis on component weights, total vehicle weight, and fuel efficiency by simulating the SAE 227a(D) driving cycle for a five-passenger vehicle with an assumed power-to-weight ratio of 50 W/kg (0.03 hp/lb) and a range of 1600 km. The results indicated that the total vehicle weight would be 1854 kg, including a passenger and cargo load of 136 kg, and that the vehicular fuel efficiency would be 51 g/km. Cost and energy parameters were estimated on the basis of existing technology and resource pricing structures. Then the results of theses status-quo assessments were considered in the light of potential changes in technology and resource prices. The net cost to the consumer for aset of recycled replacement anodes was found to be $90 to $100. At the predicted fuel efficiency, the inferred fuel-related operating costs would be about 6 cents/km. The initial vehicle cost is estimated at $6650 and the life-cycle cost at 18 cents/km. The aluminum-air-battery vehicle was found to be a serious contender for future transportation markets. 3 figures, 14 tables. (ERA citation 05:030739)

11.

MATERIALS

11A. Adhesives and Seals

AD-A088 104/5 PC **A07**/MF **A01**
Rockwell International Newbury Park CA Environmental Monitoring and Services Center
Foam Plug Development.
Final rept. Jan-Dec 79,
Robert W. Melvold, Wen-Hsiung Tu, and George H. Smith. Dec 79, 145p EMSC8316.1FR, USCG-D-30-80
Contract DOT-CG-81-78-1817

The program was conducted to improve an existing leak-plugging system, designed for plugging underwater holes up to 0.1 meter (4 inches) in diameter, and to modify it to satisfy the requirements for use by Coast Guard pollution response personnel. Eight prototypes of the external leak plugger were fabricated and extensively tested, both in the laboratory and in the field, the latter by Coast Guard Strike Team divers. The reliability of the device was verified. It was used to adequately plug holes well beyond the design limits and within seconds of activation by an operator. Aspects of satisfactory plug formation were thoroughly investigated, resulting in dramatic improvements in the applicator tip design. A larger-scale loading system for formulating significant quantities of polystyrene foam and for loading individual devices with the premixed foam was developed and used. A large plug feasibility study showed no insurmountable engineering problems precluding the development and use of a scaled-up leak-plugging system. A detailed analytical investigation of sizing requirements, loading requirements, and environmental considerations produced a recommended system configuration with a high probability for system success. A system integration study furthered the production and deployment of the external leak plugger by selecting the optimum leak plugger shipping configuration, determining the most cost-effective approach for producing the external leak plugger in quantity, filing a formal application with the DOT for exempting the loaded device from certain shipping regulations, and preparing a training program. (Author)

BDX-613-2432 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Bonding Silicones with Epoxies.
J. S. Tira. 1980, 13p CONF-800450-3
Contract AC04-76DP00613
Annual adhesive conference, St Petersburg, FL, USA, 29 Apr 1980.

It is shown that silicones, both room temperature vulcanizing (RTV) and millable rubber (press cured) can be successfully bonded to other materials using plasma treatment and epoxy adhesives. The plasma treatment using dry air atmosphere increases the surface energy of the silicone and thus provides a lower water contact angle. This phenomenon allows the epoxy adhesive to wet the silicone surface and ultimately bond. Bond strengths are sufficiently high to result in failures in the silicone materials rather than the adhesive bond. (ERA citation 05:030932)

PATENT-4 212 477 Not available NTIS
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Circumferential Shaft Seal.
Patent,
L. P. Ludwig. Filed 31 Mar 76, patented 15 Jul 80, 4p N80-28711/3, PAT-APPL-672 219
Supersedes PAT-APPL-672 219-76, N76-20488 (14-11, p 1394).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A circumferential shaft seal is described which comprises two sealing rings held to a rotating shaft by means of a surrounding elastomeric band. The rings are segmented and are of a rigid sealing material such as carbon or a polyimide and graphite fiber composite.

PB80-851090 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pressure Sensitive Adhesives. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Aug 80, 64p NERACEI NT0348
Sponsored in part by National Technical Information Service, Springfield, VA.

The reports describe chemical formulations (solvent or water base) using rubber, acrylics, silicones, block copolymers, thermoplastic rubber, hot melt, and other chemical systems. Citations on applications, performance, testing, and curing of pressure sensitive adhesives are also included. (Contains 054 citations.)

PB80-851538 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Acrylic Adhesives. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 106p NERACEI NT0515
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover the science of acrylic adhesives, reactive adhesives, cyanoa-

crylic and anerobic structural adhesives, cell adhesion growth on polymeric hydrogels, new acrylic polymers, and acrylic latex low-cost binder systems. Adhesives for industry and the properties of bone cements are also included in this bibliography. (Contains 102 citations.)

PB80-854177 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Natural Adhesives. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 49p NERACEI NT0510
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with the use of adhesives derived from natural sources, such as natural rubber and latex. Their application to pressure sensitive adhesives is presented. (Contains 058 citations.)

PB80-854185 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Natural Adhesives. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 23p
NERACUSGNT0510
Sponsored in part by National Technical Information Service, Springfield, VA.

Discussed are reports on natural adhesives, including animal hide glues. (Contains 034 citations.)

PB80-855885 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Hot Melt Adhesives. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 163p NERACEI NT0426
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information are cited on development and applications of hot melt adhesives. The following topics are discussed: chemistry, machinery, structural strength, performance, economics and uses as a pressure sensitive adhesive. (Contains 146 citations.)

PB80-856008 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Hermetic Seals. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
William V. Sassi. Jun 80, 103p
NERACIAANT0973
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design, manufacture, and application of various types of hermetic seals among which are spring-loaded teflon seals, sprayed ceramic seal systems, radial face seals, and magnetic liquid seals. (Contains 091 citations.)

PB80-859747 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Acrylic Adhesives. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 71p
NERACUSGNT0515
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with the applications 1nd properties of acrylic adhesives, including cyanoacrylates. Discussed are uses of acrylic adhesives in dentistry, as tissue adhesives, in solar cells and for bonding metals. (Contains 060 citations.)

11B. Ceramics, Refractories, and Glasses

AD-A087 519/5 PC E18/MF E18
Battelle Columbus Labs OH Metals and Ceramics Information Center
Engineering Property Data on Selected Ceramics. Volume II. Carbides,
James F. Lynch. Aug 79, 143p Rept no. MCIC-HB-07-VOL-2
Contract DLA900-78-C-1715
Replaces Section 5.2, Carbides, of 1966 Databook, AD-803 765. See also Volume 1, AD-A023 773.

This publication provides a convenient source of reliable, up-to-date, property data on carbide ceramics for use in engineering work. Its issuance constitutes completion of the second phase in a program to update and upgrade the Databook, 'Engineering Properties of Ceramics', which was issued in 1966. Subsequent phases of the program will be devoted to revisions of Databook sections on oxides, borides, silicides, and sulfides. In this updating and upgrading task, selections of property values for inclusion are made from data in the 1966 edition and data obtained in a continuous survey of subsequent literature. In addition, the data are being presented in the International System (SI) of units as well as in the engineering units used in the 1966 edition. Most data are referenced to the original source. Also, material and testing factors influencing each reported property are specified insofar as possible.

AD-A087 959/3 PC A04/MF A01
Solar Turbines International San Diego CA
Study of Erosion Mechanisms of Engineering Ceramics, Static Fatigue of Ceramics.
Final rept. 1 Apr 73-1 Jan 80,
Mary Ellen Gulden. 31 Jul 80, 58p
Contract N00014-73-C-0401

Two areas were investigated in this program: solid particle erosion of engineering ceramics and static fatigue of ceramics. In the erosion phase, the target materials investigated were several types of Si3N4, glass bonded Al2O3 and magnesium fluoride. The particle types were SiC and natural quartz sand. Particle sizes ranged between 10 and 1000 microns and particle velocities were in the subsonic regime. The particle size and velocity dependence on erosion, effect of erosion on strength and effect of number of impacts on erosion were determined. It was found that the type of erosion damage produced was more a function of relative target particle properties than of particle size and velocity for the erosion regime investigated. 'Elastic-plastic' impact, which is characterized by plastic deformation in the particle contact area, and radial and lateral cracks propagating outward from the contact area was observed on all targets impacted with SiC particles. Damage from quartz particle impact ranged from elastic-plastic on the relatively soft targets like MgF2 to shallow intergranular chipping with no secondary crack formation for the hard targets such as hot-pressed Si3N4. Static fatigue behavior of four ceramics was determined in various aqueous solutions at temperatures to 900 C.

AD-A087 960/1 PC A04/MF A01
Battelle Columbus Labs OH Metals and Ceramics Information Center
Annual Report of the Metals and Ceramics Information Center, 1 May 1979-30 April 1980.
Quarterly progress rept. no. 8, Feb-Apr 80,
Harold Mindlin, and J. F. Lynch. Jul 80, 60p
AMMRC-TR-80-33
Contract DLA900-78-C-1715

This report reviews the continuing operations and development of the Metals and Ceramics Information Center for the period of May 1, 1979 through April 30, 1980. Activity and growth of the Center are discussed in terms of the major work areas: Information, Operations, Products and Services, Service-Charge Program, Marketing, and Management. Future plans for the Center also are included. (Author)

AD-A088 458/5 PC A02/MF A01
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
Stresses Arising During the Leaching of a Two-Phase Glass,
M. G. Drexhage, and P. K. Gupta. 5 Oct 78, 8p
Rept no. RADC/ETR-80-0028
Pub. in Jnl. of The American Ceramic Society, v63 n3-4 p196-201 Mar-Apr 80.

No abstract available.

CONF-800647-4 PC A02/MF A01
Missouri Univ.-Kansas City. Dept. of Physics.
Periodic Structural Models and Radial Distribution Functions of SiO/sub X/: X = 0. To 2.
W. Y. Ching. 1980, 16p
Contract AC02-79ER10462
International conference on the physics of MOS insulators, Raleigh, NC, USA, 18 Jun 1980.

A series of random network structural models with periodic boundary conditions for SiO/sub x/ for x range from 0. (pure amorphous Si) to 2. (pure vitreous silica) within the context of microscopic random bond mixing model have been constructed. A Keating type of potential is used in the computer relaxation process. These cubic models which have 54 Si atoms and variable number of O atoms have no internal voids or dangling bonds. Each O atom binds to two Si atoms in a non-linear bridging position while each Si atom binds to four other atoms (Si or O) in a tetrahedral configuration. The densities, radial distribution functions (RDF) and partial RDF are studied as a function of x and are compared with available x-ray scattering data. It is found that for cases of x not equal to 0. or 2., the Si-Si bond lengths tend to be larger and Si-O bond lengths tend to be shorter than their respective crystalline bond lengths. Utilization of these structural models in the electronic and vibrational calculations is also discussed. (ERA citation 05:030912)

DESY-SR-79/24 PC A02/MF A01
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Laser Induced Recrystallisation and Defects in Ion Implanted Hexagonal SiC.
V. V. Makarov, T. Tuomi, K. Naukkarinen, M. Luomajaervi, and M. Riihonen. Oct 79, 9p
U.S. Sales Only.

SiC(6H) crystals amorphized with exp 14 N exp + - ion implantation were annealed with CO sub 2 laser pulses at intensities of 20 to 100 MW/cm exp 2 . Laser produced crystallisation due to residual ray absorption was studied by means of optical spectroscopy, exp 4 He exp + -ion backscattering spectrometry and channeling as well as Cu K alpha sub 1 and synchrotron x-ray diffraction topography. At low laser intensities topographs revealed linear and planar defects which contributed to increased dechanneling independent of analyzing beam energy. Minimum of lattice disorder, which was in some regions of the laser impact area smaller than that obtained in thermal annealing, was attained at the peak laser intensities of about 50 MW/cm exp 2 . (Atomindex citation 11:509609)

DOE/ER/01198-1308 PC A08/MF A01
Illinois Univ. at Urbana-Champaign. Materials Research Lab.
Panel Report on High Temperature Ceramics.
T. C. Nolet. Jan 79, 163p
Contract AC02-76ER01198

Fundamental research is reported concerning high temperature ceramics for application in turbines, engines, batteries, gasifiers, MHD, fuel cells, heat exchangers, and hot wall combustors. Ceramics microstructure and behavior are included. (ERA citation 05:030913)

INIS-mf-4519 PC A02/MF A01
Acos Finos Piratini S.A., Porto Alegre (Brazil).
Refractories for Steel-Works. Quality Control by X-Ray Fluorescence Analysis.
R. A. Villanova, C. L. Galant, C. Haas, and V. Rosenbaum. 22p CONF-770777-1
In Portuguese.32. annual congress of the Brazilian Association of Metals, Sao Paulo, Brazil, 17 Jul 1977.
U.S. Sales Only.

The routine procedures utilized for quality control of refractory materials used by PIRATINI's steelworks, are presented. The attention of the paper is

concentrated upon the following refractory types with higher consume: silicon-aluminous; aluminous; basic magnesia; basic chrom-magnesia. All steps of utilization are described, including specification, supplies programation, storage; sampling; physical tests, and also application procedures. Results from routine analysis during a six month period, by ' means of X-Ray Quantometry, using the fusion pearls procedure, are presented compared with Atomic Absorption. (Atomindex citation 09:414331)

N80-29500/9 PC **A02**/MF **A01**
Erlangen-Nuremberg Univ. (Germany, F.R.). Lehrstuhl Glas und Keramik.
Thermal Diffusion in Glass Melts under Zero Gravity Conditions: Studies under One G.
Final Report.
R. Stoephasius, H. A. Schaeffer, G. Tomandl, G. Helland, and H. Engelke. Sep 79, 25p BMFT-FB-W-79-08
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The effect of thermal diffusion as characterized by the Soret coefficient, was investigated in glasses and glass melts. A cylindrical sample of a sodium-potassium-silicate glass was exposed to a radial temperature gradient of 800 K/cm for periods of from 3 to 20 days. concentration profiles of potassium, measured by electron microprobe, indicate that potassium is depleted at the hot end and enriched at the cold end. Electroneutrality requires the sodium concentration profile to the opposite that of potassium. The case of stationary thermal diffusion was not achieved. Therefore, the differential equation was solved numerically for the non-stationary case. The calculated concentration profiles can be fitted to the experimental curves satisfactorily by assuming a mean Soret coefficient of S sub K = -0.0005/K. Due to the relatively low temperatures, convective effects apparently play only a minor role. The determination of the Soret coefficients of ions of low mobility such as Rb(+), Cs(+), and alkaline Earth ions requires higher temperatures and therefore zero gravity conditions to prevent convective perturbations.

PB80-851405 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Chinaware Manufacturing. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 72p NERACEI NT0591
Sponsored in part by National Technical Information Service, Springfield, VA.

The reports cover old and new methods of chinaware manufacturing and several firing and processing techniques. Applications of porcelain and additives to different substrates are also discussed. (Contains 055 citations.)

PB80-857303 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Carbon Black. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 207p NERACEI NT0598
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the analysis, properties, and utilization of carbon black. Citations include descriptions of the processability of rubber, morphology of blends, reinforcing systems, and fillers. (Contains 184 citations.)

PB80-857600 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Graphite Powder. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 54p NERACEDBNT0705
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the properties and applications of graphite powder are contained in this retrospective bibliography. (Contains 020 citations.)

PB80-859663 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Graphite Powder. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 56p NERACUSGNT0705
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the properties and applications of graphite powder are contained in this retrospective bibliography. (Contains 040 citations.)

11C. Coating, Colorants, and Finishes

AD-A088 064/1 PC **A03**/MF **A01**
SRI International Menlo Park CA
Dip Process Thermal Barrier Coatings for Superalloys.
Final rept. 1 Jul 79-30 Jun 80,
I. M. Allam, R. W. Bartlett, and G. N. Krishnan. Jun 80, 38p AFOSR-TR-80-0572
Contract F49620-79-C-0225

A new technique of developing thermal-barrier coatings for superalloys has been investigated. It involves hot dipping of superalloys samples into a molten bath of low melting Ce-Co or Ce-Ni alloy. By internally oxidizing these coatings, it is possible to obtain a duplex with a CeO2-rich oxide scale as the outer layer (thermal barrier) and in inner layer composite of fine cerium oxide particles dispersed in a matrix of Ni(Co)CrAl. This inner layer, or subscale, grades into the superalloy. Appropriate heat treatment can produce recrystallized CeO2 particles in the subscale that should improve adherence of the oxide scale to the subscale and substrate superalloy. The coating process does involve limited reaction between the coating alloy and superalloy. The thickness of this interaction zone can be controlled and compensated for in the design (cross section) of the superalloy component. (Author)

AED-Conf-78-049-001 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Possibilities and Limitations of Thermal Spraying.
U. Putzier. 1978, 1p CONF-780263-1
In German.DECHEMA colloquium on new thermal surface coatings, Frankfurt am Main, F.R. Germany, 16 Feb 1978.
U.S. Sales Only.

No abstract available.

HEDL-SA-1979 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Wear and Corrosion Performance of Metallurgical Coatings in Sodium.
R. N. Johnson, and D. G. Farwick. 24 Apr 80, 18p CONF-800439-10
Contract AC14-76FF02170
International conference on metallurgical coatings, San Diego, CA, USA, 21 Apr 1980.

The friction, wear, and corrosion performance of several metallurgical coatings in 200 to 650 exp 0 C sodium are reviewed. Emphasis is placed on those coatings which have successfully passed the qualification tests necessary for acceptance in breeder reactor environments. Tests include friction, wear, corrosion, thermal cycling, self-welding, and irradiation exposure under as-prototypic-as-possible service conditions. Materials tested were coatings of various refractory metal carbides in metallic binders, nickel-base and cobalt-base alloys and intermetallic compounds such as the aluminides and borides. Coating processes evaluated included plasma spray, detonation gun, sputtering, spark-deposition, and solid-state diffusion. (ERA citation 05:029359)

PB80-850670 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Molding Process Coatings. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jul 80, 42p NERACEI NT0303
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the manufacture of equipment for coating molds with materials such as pyrocarbon, polyphenylene sulfide, and urethane to increase the durability of the molds. (Contains 037 citations.)

PB80-850803 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Galvanizing. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 206p NERACEI NT0365
Sponsored in part by National Technical Information Service, Springfield, VA.

Zinc coatings on various metals have been used for many decades to provide corrosion protection. This document cites technical reports on many aspects of applying such coatings, including hot dip galvanizing, electrogalvanizing and the galvanizing of plastics. Metallurgical aspects are covered as relate to strength, adhesion, crystal growth, hardness, equilibrium phase diagrams, etc. Other articles cover special processes, electroplating both composition, properties of the coatings, corrosion protection, automation and testing. Pipe, wire, continuous galvanizing and similar topics are included. (Contains 175 citations.)

PB80-854839 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Wire Enamels. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 48p NERACEI NT0848
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the processes involved in the design, production, and testing of wire enamels, and enamelled wire. Among the various enamel materials discussed are acrylic base enamels, paper-oil enamels, hot melt and water soluble enamels. (Contains 068 citations.)

PB80-855059 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Luminous Paints. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 74p NERACUSGNT0738
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited which cover the analysis, performance, and safety of luminescent, phosphorescent, and fluorescent paints and coatings. Citations concerning health hazards and dose levels or radioluminescent materials and their application to industry are included. (Contains 057 citations.)

PB80-855067 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Luminous Paints. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 53p NERACEI NT0738
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited which cover the analysis, performance, and safety of luminescent, phosphorescent, and fluorescent paints and coatings. Citations concerning health hazards and dose levels or radioluminescent materials and their application to industry are included. (Contains 045 citations.)

PB80-855075 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.

Luminous Paints. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jul 80, 48p NERACEDBNT0738
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited which cover the analysis, performance, and safety of luminescent, phosphorescent, and fluorescent paints and coatings. Citations concerning health hazards and dose levels or radioluminescent materials and their application to industry are included. (Contains 032 citations.)

PB80-856933 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Urethane Coatings. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Aug 80, 83p NERACEI NT0347
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on formulations and applications of urethane coatings, such as fabrics, automobile parts, plastics, concrete, transportation industry, rubber and polyvinyl chloride substrates. Solventless formulations, shrinkage prevention and energy savings of urethane coatings are also included. (Contains 069 citations.)

PB80-856941 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Epoxy Coatings. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Aug 80, 66p NERACEI NT0346
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide research and applications are cited of epoxy coatings covering paints, coatings, protective coatings and powder coatings. Chemistry, physical and mechanical properties as well as solventless and water borne coatings are also discussed. (Contains 061 citations.)

PB80-857121 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Corrosion Resistant Coatings. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Aug 80, 186p
NERACEDBNT0388
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which cover technology and applications of corrosion resistant coatings, such as antireflective, antifouling, plastic and ceramic coatings. Applications include solar cells, gas turbines, coal gasification environments, pipes and power plants. (Contains 111 citations.)

PB80-857139 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Corrosion Resistant Coatings. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Aug 80, 198p
NERACUSGNT0388
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which deal with technology and applications of corrosion resistant coatings, such as antifouling, antireflection, plastic, ceramic and metal coatings. Applications include nuclear reactors and underwater equipment and materials. (Contains 187 citations.)

PB80-857147 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Corrosion Resistant Coatings. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Aug 80, 204p NERACEI NT0388
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports which cover the technology and applications of corrosion resistant coatings, including paints, plastics, and metal coatings. Applications include nuclear reactors, pipelines, gas turbines, power plants and electrical equipment. (Contains 168 citations.)

PB80-857279 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Corrosion Resistant Coatings. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Lawrence H. Marcus. Jun 80, 119p
NERACIAANT0388
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with techniques and applications of corrosion resistant coating, including aluminum, chromium, nickel, ceramic and plastic coatings and coatings for metals such as steel, nickel, titanium and cobalt. Coating processes and applications, as for gas turbines and aircraft are also discussed. (Contains 110 citations.)

11D. Composite Materials

AD-A088 103/7 PC **A06**/MF **A01**
General Dynamics San Diego CA Convair Div
Development of a Low Cost Graphite Reinforced Composite Secondary Structural Component.
Final rept. Jun 74-Oct 75,
R. C. Goad, and W. F. Wennhold. Oct 75, 107p
CASD/NSC-74-005, NADC-77231-30
Contract N62269-74-C-0369

The object of this program was to demonstrate the use of graphite-reinforced thermoplastic material to produce low-cost secondary aircraft structure. The Model 200 Navy V/STOL Fighter Attack was the aircraft from which was selected a secondary structural component for this study. The main landing gear door was picked, as it met the requirements of being secondary structure, was of convenient size, and was of sufficient complexity to be a challenging application. The autoclave process was used to consolidate A-S/polysulfone prepreg material. Skins were formed with ceramic tools, and liners were formed with a matched set of metal tools. The bulkheads were formed using aluminum tools with vacuum bagging and autoclave pressure. The door latch and hinges were machined from aluminum by conventional methods. Adhesive bonding was used to join the skin doubler to the skin, the bulkheads to skin and skin liner, and skin liner to the skin. The door latch and hinges were attached with conventional fasteners. Two rivets were used between each bulkhead and the door skin. Results of a cost comparison showed that the costs for the composite door were slightly higher (14%) than the similar metal door. All cost elements, except material cost, for the composite door were less than the comparable elements for the metal door. It is therefore concluded that the primary effort reducing thermoplastic composite cost should be directed at the cost of the raw material.

AD-A088 317/3 PC **A05**/MF **A01**
Prototype Development Associates Inc Santa Ana CA
An Analysis of Interlaminar Stress Gradients and Impact Damage in Graphite-Epoxy Laminates.
Final rept. Jan 77-Jan 78,
E. L. Stanton, and L. M. Crain. Mar 80, 86p PDA-TR-5268-00-01, NADC-80135-60
Contract N62269-77-C-0144

Interlaminar stress gradients caused by an internal disbond and by low velocity impact are analyzed using 3D finite elements. The disbonded (O/+ or -45/O2//-45/45/O) laminate warps out-of-plane under biaxial compression without large stress gradients. A much thicker 48 ply laminate (+ or -45/O2/+ or -45/O2/+ or -45/O/90)2S is analyzed for impact by a steel sphere that strikes the laminate off-center. Large subsurface shear stresses occur around the perimeter of the contact area with a sinusoidal distribution. These results were obtained using the PATCHES-III program with new constraint elements for modeling laminates. (Author)

AD-A088 439/5 PC **A12**/MF **A01**
Lockheed-California Co Burbank Rye Canyon Research Lab
Effect of Load History on Fatigue Life.
Final technical rept. 30 Aug 78-31 Dec on Task 1,
J. T. Ryder. Jun 80, 261p LR-29586, AFWAL-TR-80-4044
Contract F33615-78-C-5090

The primary objectives of this program are to: 1) study in detail how mechanical loading parameters affect the fatigue life of graphite/epoxy laminates; 2) determine the effects of environmental and geometrical perturbations on the effects studied in objective 1; 3) analyze the results in a manner such that an expanded foundation is laid for formulating fatigue life models based on knowledge of failure mechanisms. The research investigation is divided into four tasks: Task I, Diagnostic Experimentation: Task II, Effects of Loading Parameters; Task III, Effects of Environment and Geometry; Task IV, Data Analysis and Reporting. Tasks I, II and III are conducted sequentially while Task IV is conducted simultaneously with all three tasks. This report describes the analytical and experimental work undertaken in Task I.

BDX-613-2407 PC **A03**/MF **A01**
Bendix Corp., Kansas City, MO.
Simultaneous Measurement of Multilayered Composites. Milestone Report.
R. V. Heckman. Jun 80, 43p
Contract AC04-76DP00613

A theoretical treatment of the eddy current problem involving a two-layered conductor laminate is presented for a rectangular cross section coil, with experimental eddy current measurements indicating that a frequency of 1.5 MHz should be used to measure a 6.45 mu m aluminum conductor, a 0.5 MHz frequency should be used to measure a 50.8 mu m aluminum conductor, and a frequency of 30 MHz should be used to measure lift-off. The schematic and the basic design of a two-frequency microprocessor controlled eddy current system is also presented. (ERA citation 05:031071)

N80-29429/1 PC **A07**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Thermal Expansion of Composites Using Moire Interferometry.
D. E. Bowles, D. Post, C. T. Herakovich, and D. R. Tenny. Aug 80, 149p NASA-TM-80788, VPI-E-80-19
Contract NGR-47-004-129

An experimental technique for precise measurement of the thermal response of fiber-reinforced composite materials uses moire interferometry with fringe multiplication which yield a sensitivity of 833 nm (32.8 mu in.) per fringe. Results from the technique are compared with those obtained from electrical resistance strain gages, and also those predicted from classical lamination theory. Temperature dependent coefficients of thermal expansion for composite materials subjected to thermal cycling in the temperature range of 297 K (75 F) to 422 K (300 F) were determined for four laminate configurations (0, 90, 0/ + or - 45/90 sub s and 0/90/ + or - 45 sub s) of T300/5208 graphite epoxy, and ranged from -0.107 mu epsilon K/1 (-0.059 mu epsilon deg F/-) for the 0 laminate to 32.18 mu epsilon K/1 (17.88 mu epsilon F/1) for the 90 laminate. Moisture was found to greatly influence the thermal response of a quasi-isotropic laminate, resulting in hysteresis and residual compressive strain as the moisture content was reduced. Comparisons between moire and strain gage measurements were inconclusive with both techniques giving consistent but systematically different results. Differences of as much as 29% were observed.

N80-29430/9 PC **A04**/MF **A01**
Fiber Materials, Inc., Biddeford, ME.
Fabrication and Evaluation of Low Fiber Content Alumina Fiber/Aluminum Composites.
Final Report.
J. E. Hack, and G. C. Strempek. 18 Jun 80, 72p
NASA-CR-159517, AMDL-0001
Contract NAS3-21371

The mechanical fabrication of low volume percent fiber, polycrystalline alumina fiber reinforced aluminum composites was accomplished. Wire preform material was prepared by liquid-metal infiltration of alumina fiber bundles. The wires were subsequently encapsulated with aluminum foil and fabricated into bulk composite material by hot-drawing. Extensive mechanical, thermal and chemical testing was conducted on preform and bulk material to develop a process and material data base. In addition, a preliminary investigation of mechanical forming of bulk alumina fiber reinforced aluminum composite material was conducted.

N80-29431/7 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Potential Release of Fibers from Burning Carbon Composites.
V. L. Bell. Jul 80, 52p NASA-TM-80214

A comprehensive experimental carbon fiber source program was conducted to determine the potential for the release of conductive carbon fibers from burning composites. Laboratory testing determined the relative importance of several parameters influencing the amounts of single fibers released, while large-scale aviation jet fuel pool fires provided realistic confirmation of the laboratory data. The dimensions and size distributions of fire-released carbon fibers were determined, not only for those of concern in an electrical sense, but also for those of potential interest from a health and environmental standpoint. Fire plume and chemistry studies were performed with large pool fires to provide an experimental input into an analytical modelling of simulated aircraft crash fires. A study of a high voltage spark system resulted in a promising device for the detection, counting, and sizing of electrically conductive fibers, for both active and passive modes of operation.

N80-29433/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Influence of Excess Diamine on Properties of Pmr Polyimide Resins and Composites.
F. I. Hurwitz. 1980, 15p NASA-TM-81580, E-550
Proposed for Presentation at 12TH Natl. Sampe Tech. Conf., Seattle, 7-9 Oct. 1980.

By varying the stoichiometry of the reactants in the preparation of PMR polyimide resin, changes occur in molecular weight distribution which influence the rheological properties and thus the processabilibty of the resin, as well as the mechanical properties of the composite. The influence of 1-10 percent molar excess MDA on the molecular weight distribution and rheological properties of an imidized PMR system were exposed. Molecular weight distribution is characterized by gel permeation chromatography of the imidized molding compound; shear viscosity is related to changes in average molecular weight. The thermooxidative stability at 600 F, glass transition temperature, flexural and interlaminar shear properties of PMR polyimide/Celion 6000 graphite fiber composites are compared as a function of the percent excess MDA in the monomer reactant mixture.

PAT-APPL-6-085 551 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Method of Preparation of Novel Fiber Reinforced Titanium Diboride Composite Bodies and Uses Therefor.
Patent Application,
L. C. Newkirk, R. E. Riley, F. A. Valencia, and T. C. Wallace, Sr. Filed 6 Oct 79, 13p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Cloth is coated with titanium diboride in a chemical vapor deposition reaction under particular coating conditions which result in a uniform coating on the individual filaments making up the cloth fiber bundles. The coated cloth can be used as deposited as electrodes, for example, or can be hot pressed to form highly spall-resistant structures having special utility in fusion reactors, for example, as wall armor. (ERA citation 05:032603)

PB80-851975 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fiber Reinforced Composite Laminates. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 168p NERACIAANT0373
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on applications of fiber reinforced composite laminates such as cryogenic, electrical, structural membranes and others. Various testing methods, physical and mechanical properties of the fiber reinforced laminates are discussed. (Contains 137 citations.)

PB80-860166 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fiber Reinforced Composite Laminates. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 220p
NERACUSGNT0373
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the applications of fiber reinforced composite laminates such as cryogenic, electrical, structural membranes, and others. Various testing methods, physical and mechanical properties of the fiber reinforced laminates are also cited. (Contains 185 citations.)

PB80-860224 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fiber Reinforced Composites. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 221p
NERACUSGNT0372
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information is cited on fiber-reinforced composites and their production technology. Physical and chemical characteristics of boron, carbon, and some organic fibers are also included. (Contains 193 citations.)

PB80-860232 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fiber Reinforced Composites. April, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Apr 74-May 80,
Walter Van Put. Jun 80, 140p NERACIAANT0372
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information is cited on fiber-reinforced composites and their production technology. Physical and chemical characteristics of boron, carbon, and some organic fibers are also included. (Contains 125 citations.)

PB80-860240 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fiber Reinforced Composites. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 184p NERACEI NT0372
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information is cited on fiber-reinforced composites and their production technology. Physical and chemical characteristics of boron, carbon, and some organic fibers are also included. (Contains 197 citations.)

SGAE-2891 PC **A03**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Wood-Plastic Combination. Production, Properties, Present Applications, and Prospects for the Future.
R. Schaudy. Feb 78, 28p CH-229/78
In German.
U.S. Sales Only.

A review on wood-plastic combinations is given including the production (wood and plastic component, radiation hardening, curing), the obtained properties, present applications and prospects for the future of these materials. (Atomindex citation 11:508073)

11E. Fibers and Textiles

AD-A088 240/7 PC **A04**/MF **A01**
Little (Arthur D) Inc Cambridge MA
A Review and Analysis of Fiber Counting Methods.
Final rept.
Jun 80, 53p NSWC-TR-80-210
Contract N60921-78-C-A221

Fiber counting methods for use with carbon fibers are reviewed and analyzed. Recommendations are made for their use and comparison. (Author)

PB80-853724 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Dye and Dying of Textiles. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 91p NERACUSGNT0575
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on industrial processes used in the textile dyeing industry. The following subjects are included machinery, chemistry of dyes, synthesis, process performance and some pollution control studies. (Contains 078 citations.)

11F. Metallurgy and Metallography

AD-A087 880/1 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Features and Mechanisms of the Corrosion of Steels with Boiling and Condensation of N2O4.
A. M. Sukhotin, N. Ya. Lantratova, S. A. Laterner, V. A. Matushkin, and R. Ye. Polyakova. 4 Dec 79, 16p Rept no. FTD-ID(RS)T-1907-79
Edited trans. of Izvestiya Akademii Nauk BSSR, Seriya Fizika-Energeticheskikh Nauk (USSR) n2 p127-131 1973, by John A. Miller.

No abstract available.

AD-A087 961/9 PC **A04**/MF **A01**
Southwest Research Inst San Antonio TX
Crack Tip Plasticity Associated with Corrosion Assisted Fatigue.
Interim rept. Jun 79-Jun 80,
D. L. Davidson, and J. Lankford. 31 Jul 80, 51p
Rept no. SWRI-02-4268
Contract N00014-75-C-1038

The effects of a water vapor environment on crack tip plasticity in low-carbon steel have been further examined. Strains in the plastic zone, as determined by stereoimaging, have been used to compute stresses at the same locations, and an estimate of the energy expended for creation of new crack area may also be computed using the same strains. These values are compared with similar information derived previously using plastic zone subgrain size distributions as determined by electron channeling. There is general agreement between the data determined by the two techniques. A model is offered for including the effects of water vapor upon crack tip plasticity into the damage ac-

cumulation analysis of fatigue crack propegation. A critical discussion is also given of the findings to date on the effects of environment on crack tip plasticity, and it is concluded that those findings may be explained by changes in the material properties very close to the crack tip, rather than in the bulk of the plastic zone. (Author)

AD-A088 052/6 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Neutron Irradiation Effects on Fatigue Crack Propagation in Type 316 Stainless Steels at 649 C.
Memorandum rept.,
D. J. Michel, and H. H. Smith. 1 Aug 80, 20p
Rept no. NRL-MR-4282

The fatigue and creep-fatigue crack propagation performance of Type 316 stainless steel was investigated following fast neutron irradiation to a fluence level of about 5 x 10 to the 22nd power n/sq. cm (> O.1 MeV), about 26 displacements per atom (dpa), at 649 C. The results from fatigue tests of both annealed and 20 percent cold worked steel show that irradiation produced no significant effect on crack propagation rate when compared with unirradiated steel tested at 649 C. For tests conducted using creep-fatigue cycling, the inclusion of a two-minute hold time at the maximum cyclic load resulted in a marked increase in the crack propagation rate of the annealed steel. The effect of a one-minute hold time in the 20-percent cold worked, irradiated steel was to significantly increase the crack propagation rate at 649 C. Scanning electron microscope examination of the tested specimens revealed that the crack propagation mode of the specimens which exhibited increased crack propagation rates was primarily intergranular while a transgranular mode was observed for specimens with lower crack propagation rates. The results point toward a synergistic relationship between thermochemical history, precipitate formation, and hold time effects as the responsible mechanism for the crack propagation performance. (Author)

AD-A088 152/4 PC **A02**/MF **A01**
Naval Surface Weapons Center Dahlgren VA
Shock Compression of Tantalum.
Final rept.,
Willis Mock, Jr., and William H. Holt. Jun 80, 25p
Rept no. NSWC/TR-80-92
Contract MIPR-A35200-9-0004

The free-surface velocity of a shock-loaded 3.73-mm-thick tantalum disk has been measured with a capacitor gauge. Stress reverberations were produced in the tantalum disk by impacting it with a 2.65-mm-thick alpha titanium disk at a velocity of 0.111 km/s in a gas gun. An initial shock compressive stress slightly larger than the measured 2.1-GPa Hugoniot elastic limit was produced in the tantalum. The shape of the free-surface-velocity profile suggested that spall fracture did not occur in the specimen disk at this stress level. This result was verified by examining the recovered and sectioned disk. (Author)

AD-A088 292/8 PC **A02**/MF **A01**
Brown Univ Providence RI Div of Engineering
Electronic Structure and Stability of Metallic Glasses.
Final rept. 14 May 76-14 May 80,
Jan Tauc. 1 Aug 80, 12p ARO-13723.10-P
Grant DAAG29-76-G-0221

The work was concentrated on Jeepening our understanding of the properties of electrons in metallic glasses and amorphous thin films and their role in determining the atomic arrangement in these materials. It includes a photoemission study of Nb-Ni glasses, an analysis of an electronic contribution to the free energy of a binary liquid that determines the atomic correlations, EXAFS studies of the structure of Pb-Ge quenched glasses and amorphous thin films, optical studies of amorphous Au-Si system, and a study of the magneto-optic effect in Fe80B20 metallic glass. (Author)

AD-A088 358/7 PC **A03**/MF **A01**
Rensselaer Polytechnic Inst Troy NY Dept of Materials Engineering
Fundamentals of Corrosion Fatigue Behavior of Metals and Alloys.
Technical rept.,
David J. Duquette. Aug 80, 33p
Contract N00014-75-C-0466

It is well known that environment plays a very important role in fatigue failures. In some cases only crack propagation rates are affected; however, for many others all of the steps leading to failure, preinitiation deformation, crack initiation and crack propagation are affected. For still other cases, only the crack initiation and early propagation processes are affected. This paper attempts to evaluate the mechanisms which have been proposed for environmental effects on the early stages of fatigue damage, including crack initiation and early propagation in gaseous and in aqueous environments. Evidence is presented which indicates that there is no unifying theory of environmental fatigue, but that each alloy/environment couple may exhibit significantly different behavior, depending on factors such as thermodynamics and kinetics as well as microstructure, slip character, etc. (Author)

AD-A088 540/0 PC **A03**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
The Austenitizing Behavior of a Low Alloy Steel.
Technical rept.,
Peter A. Thornton. May 80, 34p ARLCB-TR-80013, AD-E440 079

The austenitizing behavior of a low alloy steel was examined from both the microstructural and the mechanical property standpoint. The temperature range over which austenitizing took place was accurately determined by metallographic and analytical techniques. Metallographic evidence showed that the dissolution of carbide continues after the crystallographic transition is completed. Also, the dissolution of the preponderance of carbide coincides with a 'leveling-off' trend in mechanical property response, viz., yield strength and Charpy impact toughness. The data demonstrated that a minimum temperature of 774 C (1425 F) can sufficiently austenitize this steel under the appropriate conditions. However, because of chemical segregation invariably found in large forgings, it is a sound practice to allow some contingency in the heat treatment parameters that will consistently provide an adequate austenitizing condition in the thickest sections of a component.

AED-Conf-78-078-001 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Material Transport in Liquid Phase Sintering.
W. J. Huppmann. 1978, 1p CONF-780474-1
In German.12. work meeting of the Max-Planck-Institut fuer Metallforschung, Stuttgart, F.R. Germany, 12 Apr 1978.
U.S. Sales Only.

No abstract available.

ANL-Trans-1190 PC **A02**/MF **A01**
Argonne National Lab., IL.
Influence of Ultrasonic Vibrations on Short-Range Order in alpha -Aluminum Bronzes.
V. Kh. Anchev. Jul 80, 10p
Contract W-31-109-ENG-38
A 7th conference, x-ray structure analysis in metallurgy and metallography; Ghivice, Poland, 1974, pp 174-181.

The reasons of ultrasonic softening of annealed alpha -aluminium bronzes types Br4 and Br7 /9 at. % and 15 at. % Al/ were investigated. The observations pointed out, that the zones, located at a distance +- 2/8 from the place of the knot of ultrasonic stresses /the zone of hardening/ are subjected to softening /decreasing of hardness/ by order of 5 to 10%. The x-ray investigations of background intensity pointed out that during ultrasonic radiation there is a change of the short range order, received after annealing, i.e., the parameter of alpha sub 1 is decreasing. The decreasing of tau-values is connected with lowering of lattice friction during dislocation moving through the lattice, that is with the softening. The change of alpha sub 1 in the hardened zone is greater than in the softened zones. The temperature, time and size / grain size/ relations of tau are similar to the corresponding relations of the softening. It was supposed that the softening is connected with decreasing of the degree of short range order, this effect overcomes the effect of work hardening in the softened zones. On the other hand, the work hardening overcomes the softening connected with the disordering in the hardened zone. (ERA citation 05:030868)

BARC-1019 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Diffusion of Cobalt in alpha Zirconium.
U. Ghosh, D. D. Pruthi, and M. S. Anand. 1979, 5p
U.S. Sales Only.

The diffusion of exp 60 Co in alpha zirconium has been studied in the temperature range of 873-1123 K using the sectioning technique. The diffusion parameters obey the following Arrhenius equation:- D = (1.132 +- 0.22)10 exp -4 exp((-136.43 +- 3.50 KJ)/RT)m exp 2 s exp -1 . The diffusivity in this phase is as high as that observed in beta -phase. It is also about five orders of magnitude higher when compared to the self diffusion values. The high diffusivity of cobalt in alpha zirconium has been explained on the basis of an interstitial mechanism. (Atomindex citation 10:493951)

BDX-613-2435 PC **A03**/MF **A01**
Bendix Corp., Kansas City, MO.
Thin Film Corrosion. Final Report.
M. K. Raut. Jun 80, 26p
Contract AC04-76DP00613

Corrosion of chromium/gold (Cr/Au) thin films during photolithography, prebond etching, and cleaning was evaluated. Vapors of chromium etchant, tantalum nitride etchant, and especially gold etchant were found to corrosively attack chromium/gold films. A palladium metal barrier between the gold and chromium layers was found to reduce the corrosion from gold etchant. (ERA citation 05:030896)

BNL-27344 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Application of Analytical Electron Microscopy to the Study of Intergranular Corrosion in 304 Stainless Steel.
C. S. Pande, and R. L. Sabatini. 1980, 9p CONF-800801-5
Contract AC02-76CH00016
Annual meeting of the Electron Microscopy Society of America and 15. Microbeam Analysis Society Conference, San Francisco, CA, USA, 4 Aug 1980.

The technique of analytical electron microscopy in a scanning transmission electron microscope fitted with an energy dispersive x-ray spectrometer is used to measure the chromium depletion in sensitized 304 stainless steel along the grain boundaries. It is shown that such measurements could be misleading unless care is taken to properly choose the regions on the grain boundaries for such analysis. (ERA citation 05:029324)

BNL-27964 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Flux Pinning in Bronze-Processed Nb sub 3 SN Wires.
M. Suenaga, and D. O. Welch. 1980, 13p CONF-800587-4
Contract AC02-76CH00016
International cryogenic materials conference, Upton, NY, USA, 28 May 1980.

The scaling law derived by Kramer for magnetic flux pinning in high magnetic fields was examined for its applicability to the magnetic field dependence of critical-current densities in the bronze processed monofilamentary Nb sub 3 Sn wires. From this it was concluded that: (1) its prediction for the form of the dependence of critical current on magnetic field and grain size (/J vector /sub c/ x H vector/ approx. h/sup 1/2/(1-h) exp 2 (1-a sub 0 sqrt rho) exp -2) was found to be very good in most cases including wires with very small Nb sub 3 Sn grains (approx. 400 A). It was found very useful in comparison of J/sub c/ for different wires and in extrapolating to obtain H/sub c2/ for these wires. (2) However, it could not account consistently for the anisotropy in critical current of a tape which was measured with H applied perpendicular

and parallel to the tape face. (3) The values of kappa sub 1 which were determined with the scaling law were too small by a factor of 2 to 3, and the trend in the variation with heat-treating time was opposite to that which is reasonably to be expected. That the behavior of kappa sub 1 is thus seriously in contradiction with the expected behavior for Nb sub 3 Sn suggests basic faults in the derivation of the scaling equation for critical currents at high magnetic fields. (ERA citation 05:029307)

CEA-BIB-226 PC **A04**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. des Reacteurs a Neutrons Rapides.
Corrosion by Liquid Metals - Application to Liquid Sodium.
L. Lavielle. Oct 78, 72p
In French.
U.S. Sales Only.

In this bibliographic review on the corrosion by liquid metals, the first part is devoted to the theoretical aspects of the problem and the second part concerns the corrosion of steels by liquid sodium, as example. Obvious the numerous works now published, the mechanisms are still leaving bad known. (Atomindex citation 10:493835)

CEA-CONF-4545 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Lab. d'Electronique et de Technologie de l'Informatique.
Natural Defects and Defects Created by Ionic Implantation in Zinc Tellurium.
J. P. Roche, M. Dupuy, and J. C. Pfister. 1977, 5p CONF-7706134-7
In French.Congress of the French Physical Society, Poitiers, France, 27 Jun 1977.
U.S. Sales Only.

Various defects have been studied in ZnTe crystals by transmission electron microscope and by scanning electron microscope in cathodo-luminescence mode: grain boundaries, sub-grain boundaries, twins. Ionic implants of boron (100 keV - 2x10 exp 14 and 10 exp 15 ions cm exp -2) were made on these crystals followed by isochrone annealing (30 minutes) of zinc under partial pressure at 550, 650 and 750 exp 0 C. The nature of the defects was determined by transmission electron microscope: these are interstitial loops (b=1/3<111>) the size of which varies between 20 A (non-annealed sample) and 180A (annealed at 750 exp 0 C). The transmission electron microscope was also used to make concentration profiles of defects depending on depth. It is found that for the same implant (2x10 exp 14 ions.cm exp -2), the defect peak moves towards the exterior of the crystal as the annealing temperature rises (400 - 1000 and 7000 A for the three annealings). These results are explained from a model which allows for the coalescence of defects and considers the surface of the sample as being the principal source of vacancies. During the annealings, the migration of vacancies brings about the gradual annihilation of the implant defects. The adjustment of certain calculation parameters on the computer result in giving 2 eV as energy value for the formation of vacancies. (Atomindex citation 11:506623)

CEA-CONF-4584 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Metallurgie.
Study of Nb-Ge-Si Films Deposited by CVD.
S. Paidassi, J. Spitz, and J. Besson. 1979, 12p CONF-790442-19
International conference on metallurgical coatings, San Diego, CA, USA, 23 Apr 1979.
U.S. Sales Only.

Nb-Ge-Si films have been prepared by CVD. Results of X-ray diffraction, electron microscopy and chemical composition are reported. The A15 phase has been obtained over a wide composition range, and a new Nb sub 5 Si sub 3 structure has been produced. The stability and homogeneity of these materials are discussed. (Atomindex citation 11:507921)

CEA-CONF-4620 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Possibility of Use Small Size Specimens for Toughness Evaluation of Pressure Vessel Steels in Surveillance Programmes.
P. Petrequin, and P. Soulat. 1979, 14p CONF-790234-2
IAEA specialists' meeting, Vienna, Austria, 26 Feb 1979.
U.S. Sales Only.

In order to caracterize fracture toughness evolution of pressure vessel steels under irradiation, two types of small size specimens able to be introduced in surveillance capsules were studied: small (12.5 mm thick) CT specimens and precracked Charpy. Size effects on determination of J1C on irradiated and unirradiated steel are studied using 12.5 and 25 mm thick CT specimens. Kid is measured using precracked Charpy specimens on several pressure vessels irradiated and unirradiated. (Atomindex citation 11:508098)

CEA-R-4960 PC **A07**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Determination of a Massive Zirconium Hydride Production Cycle.
J. P. Loche. Jun 79, 130p
In French.
U.S. Sales Only.

This note includes: a bibliographical study on the physical, chemical and metallurgical properties of zirconium and its hydride, a brief review of the different methods of zirconium hydride conditioning and a more detailed study of the conditioning process by massive hydride formation. A systematic study was devoted to the thermal method of hydrogen incorporation with a view to obtaining articles of homogeneous composition and of hydrogen concentration as close as possible to the formula ZrH sub 2 . This was achieved by original tests designed to measure the plasticity of the metal or of its hydride during the process. The hydride formation cycle considered optimum is described for an initial metal of carefully selected chemical and metallurgical properties. (Atomindex citation 11:507989)

CONF-800205-13 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Nuclear Microanalysis as a Probe of Impurity-Defect Interactions.
M. B. Lewis, and K. Farrell. 1980, 28p
Contract W-7405-ENG-26
American Institute of Metallurgical Engineers meeting, Las Vegas, NV, USA, Feb 1980.

It is shown that nuclear microanalysis offers unique opportunities for probing impurity migration and impurity-defect interactions in irradiated materials. The principles and practice of the technique are described and the special advantages and limitations are discussed. Procedures are outlined for extracting (1) impurity diffusion coefficients, (2) impurity-defect binding energies, and (3) trap generation coefficient of heavy ions used to create displacement damage. Examples involving the impurities deuterium and helium in austenitic stainles steels and nickel are described. Preliminary values are given for: the bulk diffusion coefficient of deuterium in austenite at 25 exp 0 C (1.4 x 10 exp -12 cm exp 2 /s); the binding energies of deuterium with point defects in austenite and of helium-3 in nickel (0.33 and 2.1 eV, respectively); and a room-temperature trap generation coefficient for deuterium in nickel-ion-bombarded austenite of approx. 15 per incident nickel ion. (ERA citation 05:030859)

DESY-SR-79/19 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
4F Hole Lifetime and Surface Chemical Shift in Yb Metal.
S. F. Alvarado, M. Campagna, and W. Gudat. Sep 79, 14p
U.S. Sales Only.

We report on UHV photoemission studies of Yb metal using synchrotron radiation in the photon energy range 25<h upsilon<180 eV, whereby maximum surface sensitivity can be reached. The 4f photoemission spectrum shows a quadruplet structure due to a superposition of two 4f spin orbit doublets. One doublet has a very symmetric lineshape and an extremely narrow lifetime linewidth 2 gamma approximately equal to 0.013 eV. We attribute it to bulk emission. The other doublet exhibits almost symmetric lines with a much larger lifetime linewidth 2 gamma approximately equal to 0.43 eV. It has also a larger binding energy by 0.6-+0.03 eV. We attribute this as being due to chemically bound Yb atoms located at the surface. We discuss the implications of these findings for recent high resolution photoemission studies of Rare Earth (RE) metals and their analysis. (Atomindex citation 11:506525)

DESY-SR-79/21 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Resonance Enhancement of the Nickel D-Band Photoemission.
J. Barth, G. Kalkoffen, and C. Kunz. Sep 79, 6p
U.S. Sales Only.

A detailed analysis of the Ni d-band photoemission near the 3p threshold is presented. The results demonstrate that the d-band emission is coupled to the 3p excitation. The coupling is shown to differ for different parts of the d-band. (Atomindex citation 11:506532)

DOE/ER/03158-89 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY.
Determination of the Composition of Ordered Pt sub 3 Co by Atom-Probe Field-Ion Microscopy: Intrinsic Problems.
M. Yamamoto, and D. N. Seidman. May 80, 8p CONF-800730-2
Contract AS02-76ER03158
27. international field emission symposium, Tokyo, Japan, 7 Jul 1980.

Atom-probe field-ion microscope (FIM) analyses were performed on specimens of fully ordered Pt sub 3 Co. The purpose of the investigation was to study the effects of different important experimental variables on the composition measured by the atom probe technique. The dependence of the alloy's composition on the following variables was determined: (1) pulse fraction (f); (2) specimen temperature; (3) crystal plane; and (4) field-evaporation rate. It was demonstrated that the composition determined by atom probe analyses of Pt sub 3 Co was very sensitive to the above four variables. The observations were discussed in terms of possible field-evaporation mechanisms. (ERA citation 05:030860)

DOE/ER/05002-9 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
Structure of High Angle Grain Boundaries in Metals and Ceramic Oxides.
R. W. Balluffi, P. D. Bristowe, and C. P. Sun. Dec 79, 70p CONF-791045-8
Contract AS02-78ER05002
American Ceramic Society conference, New Orleans, LA, USA, 14 Oct 1979.

A critical review is given of the state of our current knowledge of the structure of high angle grain boundaries in metals and in ceramic oxides. Particular attention is given to effects due to differences in the bonding and crystal structure in these solid types. The results of recent experimental work and efforts to model grain boundary structure using computer simulation methods are described. Important characteristic features of boundaries in these materials are discussed. Difficulties which are presently being encountered in efforts to determine their structure are pointed out. (ERA citation 05:029287)

DOE/ER/10556-1 PC **A04**/MF **A01**
Brown Univ., Providence, RI. Div. of Engineering.
Combined Macroscopic and Microscopic Approach to the Fracture of Metals. Technical Annual Progress Report, 1979-1980.
R. J. Asaro, J. Gurland, A. Needleman, and J. R. Rice. Jun 80, 55p COO-3084-79
Contract AC02-80ER10556

The following results are reported: (1) extremely good theoretical-experimental correlation was found between our theoretical predictions based on asymptotic analysis with numerical finite element studies and the experimentally monitored

crack growth for a large range of stable crack growth in 4140 steel; (2) a theoretical model was developed for the critical conditions of crack initiation at rigid particles as a precursor of ductile rupture in steels; (3) as part of environmentally sensitive fracture mechanisms, it was found that hydrogen can promote a ductile-to-brittle fracture transition with increasing charging current density in low carbon steel; and (4) a new variational principle has been established for the combined processes of plastic creep flow and grain boundary diffusion and has been constructively applied to the problem of cavity growth under creep conditions. (ERA citation 05:029296)

EUR-5792 PC **A04**/MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
Thermal Desorption (Outgassing) of Inconel.
F. W. Reiter, and J. Campsilvan. 1977, 74p
U.S. Sales Only.

The quantity and the composition of gas released from Inconel 600 samples after different methods of surface preparation have been measured during a heating cycle to a temperature of 500 exp 0 C. After this first outgassing cycle the specimens were exposed to dry air and nitrogen, and the quantity and the composition of the re-adsorbed gas have been determined during a similar heating cycle. The results of these measurements are important for the mechanical and thermal pre-treatment of the vacuum wall surface of fusion devices using Inconel 600 as the vacuum wall material. (Atomindex citation 10:423181)

HEDL-SA-2003-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Effect of Temperature Changes on Swelling and Creep of AISI 316.
F. A. Garner, E. R. Gilbert, D. S. Gelles, and J. P. Foster. Apr 80, 22p CONF-800609-8
Contract AC14-76FF02170
10. international symposium on effects of radiation on materials, Savannah, GA, USA, 3 Jun 1980.

A number of previous publications have shown that the swelling of cold-worked AISI 316 is quite sensitive to changes in temperature which occur during irradiation. In this report those data are expanded and reanalyzed to show that the concurrent irradiation creep is also quite sensitive to changes in irradiation temperature. An explanation is advanced to explain this behavior in terms of the sensitivity to temperture history of the radiation-induced microchemical evolution of this steel. In particular, the sensitivity to temperature history of the radiation-stabilized gamma prime phase is invoked to explain the enhanced creep and swelling behavior of AISI 316 components which experienced either gradual or abrupt decreases in temperature. The phase development observed in this steel in response to temperature changes during irradiation is also compared to the similar behavior found in aged specimens subjected to isothermal irradiation. (ERA citation 05:029334)

HEDL-SA-2150-FP PC **A02**/MF **A01**
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div.
Characterization of the Sodium Corrosion Behavior of Commercial Austenitic Steels.
S. A. Shiels, C. Bagnall, A. R. Keeton, R. E. Witkowski, and R. P. Anantatmula. 1980, 8p
CONF-800401-22
Contract AC14-76FF02170
International conference of liquid metal technology for energy systems, Richland, WA, USA, 20 Apr 1980.

During the course of an on-going evaluation of austenitic alloys for potential liquid metal fast breeder reactor (LMFBR) fuel pin cladding application, a series of commercial alloys was selected for study. The data obtained led to the recognition of an underlying pattern of behavior and enabled the prediction of surface chemistry changes. The changes in surface topographical development from alloy to alloy are shown and the important role played by the element molybdenum in this development is indicated. The presentation also illustrates how a total damage equation was evolved to encompass all aspects of weight loss and metal/sodium interactions: wall thinning ferrite layer formation and intergranular attack. The total damage equation represents a significant departure from the classical description of sodium corrosion in which weight loss is simply translated into wall thinning. (ERA citation 05:029325)

INEL-tr-50 PC **A02**/MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Pig-Iron Processes: Sweden's Research and Development Needs.
J. O. Edstrom. 7p
Contract AC07-76ID01540
C STU-Report No. 74-1977, pp 3-9.

Current research and development regarding pig iron production processes were studied. Steps for future research are described. (ERA citation 05:030844)

INIS-mf-5466 PC **A07**/MF **A01**
Bochum Univ. (Germany, F.R.). Abt. fuer Physik und Astronomie.
Structure of the Distortion Field of Substitutional Magnesium in Aluminium.
K. Werner. 21 Jun 78, 136p
In German.Thesis.
U.S. Sales Only.

The cross-section of the diffuse-elastic scattering of AlMg has been determined by experiments. Due to the development of a measuring programme with variations in temperature and concentration, experimental conditions have been defined leading to a statistical distribution of the Mg atoms in the Al matrix. Experiments have shown this is achievable only at high temperatures and for low defect-atom concentrations. Since in this case the amount of phonon scattering is higher than the diffuse-elastic intensity, every measurement has to be accompanied by an energetic analytic of the scattered neutrons. A comparison of measured scattering processes with the predictions of the pseudopotential concept revealed quantitative agreement whithin a restricted but continuous range of pulse transmission, as well as a qualitative verification of the calculated structure over the total measuring range. (Atomindex citation 11:506646)

INIS-mf-5516 PC **A02**/MF **A01**
Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice (Czechoslovakia).
Some Metallophysical Research Results of AVIAL Alloy Samples.
A. Ranusa, L. Kupca, P. Beno, and H. Benova. 2p CONF-7804146-14(Sum.)
In Slovak.Corrosion problems on nuclear reactor components, Piestany, Czechoslovakia, 12 Apr 1978.
U.S. Sales Only.

No abstract available.

INIS-mf-5517 PC **A02**/MF **A01**
Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice (Czechoslovakia).
Ferritic Steels for Work in Sodium.
V. Walder, and M. Gottwald. 2p
In Czech.
U.S. Sales Only.

No abstract available.

INIS-mf-5518 PC **A02**/MF **A01**
Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice (Czechoslovakia).
Steel Corrosion in Water and Steam.
J. Bren, and V. Janovcova. 2p CONF-7804146-11(Sum.)
In Czech.Corrosion problems on nuclear reactor components, Piestany, Czechoslovakia, 12 Apr 1978.
U.S. Sales Only.

No abstract available.

INKA-Conf-79-225-007 PC **A02**/MF **A01**
Central Electricity Generating Board, Gravesend (England). Scientific Services Dept.
Regenerative Heat Treatments for the Extension of the Creep Life of the Superalloy IN-738.
R. A. Stevens, and P. E. J. Flewitt. 1979, 6p
CONF-790801-11
International conference on the strength of metals and alloys, Aachen, F.R. Germany, Aug 1979.
U.S. Sales Only.

Uniaxial creep tests have been performed on the cast nickel-base superalloy IN-738 at 1023K and 1123K. Microstructural damage occurring during creep has been characterised using transmission electron microscopy of surface and extraction replicas. Considerable coarsening of the gamma ' precipitates occurs during creep causing a progressive loss of creep strength. Intermediate heat treatment of interrupted specimens regenerates a microstructure similar to the original, and on retesting significant creep life extensions are observed. These heat treatments do not completely recover the creep life due to the development of grain boundary cavitation. Additional heat treatments were performed under a superimposed hydrostatic pressure of 138 MPa to remove these cavities. (Atomindex citation 11:513368)

Juel-1548 PC **A07**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe und Heisse Zellen.
Use of X-Ray Fluorescence and X-Ray Diffraction Analysis for the Investigation of Oxidation Reactions in Alloys.
G. Weden, A. Naoumidis, and H. Nickel. Oct 78, 129p
In German.
U.S. Sales Only.

Samples of three nickel-base alloys, which are candidate materials for the heat transfer systems of high temperature reactors, were annealed for 100 hours at 780, 930 and 1080 exp 0 C in an atmosphere of 17 mbar H sub 2 O and 260 mbar H sub 2 . The test specimens were examined before and after annealing using X-ray fluorescence and X-ray diffraction analysis. The results obtained were compared with the results of destructive test methods, in particular metallography and microanalysis. The comparison showed that it is possible to obtain qualitative and quantitative data on surface corrosion using the non-destructive X-ray methods. The precision, applicability and limitations of X-ray fluorescence and X-ray diffraction analysis for the investigation of surface corrosion reactions were studied and the observations compared with the results and the interpretations of other authors. (Atomindex citation 11:507882)

Juel-1601 PC **A04**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.).
Compton Scattering on the gamma - alpha Phase Transition in Cerium.
U. Kornstaedt. Jul 79, 54p
In German.Thesis.
U.S. Sales Only.

Compton profiles for gamma - and alpha -Cer were measured using Cr51 as a gamma -radiation source. The experimental profiles have been corrected for multiple scattering by Monte-Carlo techniques. The corrected profiles are compared with theoretical profiles which are calculated on the basis of the renormalized free atom model for 6s electrons and the tight-binding model of 4f and 5d electrons. The experimental results show clearly that the promotional model is not valid. Instead a possible explanation for the observed phase transition may be a Mott transition. To better determine this, improved electron wave functions, such as might be obtained by band structure calculations, are needed. (Atomindex citation 11:506479)

JAERI-M-8178 PC **A07**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Computer Codes for Simulating Atomic-Displacement Cascades in Solids Subject to Irradiation.
T. Asaoka, Y. Taji, T. Tsutsui, M. Nakagawa, and T. Nishida. Mar 79, 126p
In Japanese.
U.S. Sales Only.

In order to study atomic displacement cascades originating from primary knock-on atoms in solids subject to incident radiation, the simulation code CASCADE/CLUSTER is adapted for use on FACOM/230-75 computer system. In addition, the code is modified so as to plot the defect patterns in crystalline solids. As other simulation code of the

cascade process, MARLOWE is also available for use on the FACOM system. To deal with the thermal annealing of point defects produced in the cascade process, the code DAIQUIRI developed originally for body-centered cubic crystals is modified to be applicable also for face-centered cubic lattices. By combining CASCADE/CLUSTER and DAIQUIRI, we then prepared a computer code system CASCSRB to deal with heavy irradiation or saturation damage state of solids at normal temperature. Furthermore, a code system for the simulation of heavy irradiations CASCMARL is available, in which MARLOWE code is substituted for CASCADE in the CASCSRB system. (Atomindex citation 11:509319)

KFK-2687 PC **A07**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Radiochemie.
Thermodynamic investigations on the Systems Yttrium-Platinum and Neptunium-Platinum by EMF-Measurements on Solid-State Galvanic Cells.
L. Hellwig. Nov 78, 128p
In German.Thesis.
U.S. Sales Only.

The reduction of oxides of non-noble metals Me with highly purified hydrogen in the presence of noble metals E (E = Pt, Pd, Ir, Rh) - the so-called coupled reduction - results in many cases in the formation of intermetallic compounds EMe/sub x/. It is shown how, by means of emf-measu.ements on solid-state galvanic cells, the course of the coupled reduction can be followed and subsequently the data employed to determine thermodynamic values for the system Eme/sub x/. A suitable experimental arrangement has been developed with which thermodynamic investigations on the systems yttrium-platinum and neptunium-platinum have been performed. From the behaviour of the standard molar free enthalpy of the dissolution of yttrium or neptunium in PtMe/sub x/ (Me = Y, Np) with changing temperature T and composition x the standard molar free enthalpy of formation of the following alloy phases were calculated: Pt sub 5 Y (1100-1600 exp 0 K), Pt sub 3 Y (1300-1700 exp 0 K), Pt sub 5 Np (1100-1600 exp 0 K) and Pt sub 3 Np (1100-1600 exp 0 K). (Atomindex citation 11:506576)

LA-UR-80-1543 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Improved Technique for Determining Dynamic Material Properties Using the Expanding Ring.
R. H. Warnes, T. A. Duffey, R. R. Karpp, and A. E. Carden. 1980, 15p CONF-800641-1
Contract W-7405-ENG-36
International conference on the metallurgical effects of high strain rate deformation and fabrication, Albuquerque, NM, USA, 22 Jun 1980.

Since its introduction nearly two decades ago, the expanding ring test has shown considerable promise as a simple method of obtaining strain-rate-sensitive uniaxial material property data. The procedure is to monitor the kinematics of a uniformly expanding ring. The stress-strain-strain rate response of the ring material can then be calculated from the ring equation of motion and the recorded data. Efforts in the past have been based upon recording the transient displacement of the ring. Determination of the stress in the ring then required double differentiation with respect to time of the ring displacement. The work reported herein is an attempt to overcome this difficulty by directly measuring ring velocity as a function of time by means of a laser velocity interferometer; this method requires one less differentiation of the data. The procedure is illustrated by experiments performed on annealed and hardened copper rings. Results are compared to quasi-static material properties determined for the same materials using conventional techniques. (ERA citation 05:030879)

LBL-10633 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
High-Temperature Thermodynamic Activities of Zirconium in Platinum Alloys Determined by Nitrogen-Nitride Equilibria.
D. A. Goodman. May 80, 82p
Contract W-7405-ENG-48
Thesis.

A high-temperature nitrogen-nitride equilibrium apparatus is constructed for the study of alloy thermodynamics to 2300 exp 0 C. Zirconium-platinum alloys are studied by means of the reaction 9ZrN + 11Pt implies Zr sub 9 Pt sub 11 + 9/2 N sub 2 . Carful attention is paid to the problems of diffusion-limited reaction and ternary phase formation. The results of this study are and a/sub Zr//sup 1985 exp 0 C/ = 2.4 x 10 exp -4 in Zr sub 9 Pt sub 11 delta G/sub f 1985 exp 0 C/ exp 0 Zr sub 9 Pt sub 11 less than or equal to -16.6 kcal/g atom. These results are in full accord with the valence bond theory developed by Engel and Brewer; this confirms their prediction of an unusual interaction of these alloys. (ERA citation 05:030889)

LBL-10683 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Detection of Solute Segregation at Grain Boundaries.
J. Briceno-Valero, and R. Gronsky. Mar 80, 3p
CONF-800801-7
Contract W-7405-ENG-48
Annual meeting of the Electron Microscopy Society of America and 15. Microbeam Analysis Society Conference, San Francisco, CA, USA, 4 Aug 1980.

Studies of grain boundary segregation in metallurgical systems are traditionally based upon the premise that grain boundaries are more likely sites for solute atoms than their surrounding grains. This idea is manifested in experimental studies which distinguish the solute concentration at boundaries from that of grain interiors using various spectroscopic techniques, including more recently, energy dispersive x-ray analysis in TEM/STEM instruments. A typical study consists of spot or line scans across a grain boundary plane in order to detect concentration gradients at the boundary region. It has also been pointed out that there are rather severe problems in quantitatively determining the absolute solute concentration within the grain boundary, and data correction schemes for this situation have been proposed. The present paper is concerned with an alternative study of grain boundary segregation where the distribution of solute atoms along the boundary plane (as opposed to that across the boundary plane) is sought. The interest here is to establish whether or not a relationship exists between the structural defect configuration of the boundary plane and site preference for solute segregation. (ERA citation 05:029288)

LBL-10922 PC **A10**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Characterization of Ferritic G.M.A. Weld Deposits in 9% Ni Steel for Cryogenic Applications.
K. W. Mahin. Apr 80, 215p
Contract W-7405-ENG-48
Thesis.

Low temperature containment vessels of 9% Ni are normally fabricated using the shielded metal arc (S.M.A.W.) or the gas metal arc (G.M.A.W.) welding processes. Available filler metals compatible with these processes are highly alloyed austenitics, whose strength levels undermatch those of the base plate. A more efficient weld joint would be a low alloy ferritic deposit. Although acceptable matching ferritic gas tungsten arc weld (G.T.A.W.) wires have been developed, similar progress has not been made in the area of ferritic G.M.A. weld wires. Most of the prior work in this area has focused on correlating composition with mechanical properties, without a corresponding evaluation of resultant microstructure. The study presented focused on establishing correlations between chemistry, microstructure and mechanical properties for four different ferritic G.M.A. weld deposits in 9% Ni steel, with the purpose of developing a better understanding of the factors controlling the 77K (-196 exp 0 C) toughness behavior of these weld metals. Microstructural characterization was carried out using standard optical and scanning electron microsccpes, as well as a variety of advanced analytical techniques, including transmission electron microsccpy (T.E.M.), scanning T.E.M., Moessbauer spectroscopy and Auger electron spectroscopy. (ERA citation 05:030864)

NIIAR-36(395) PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Radiation Stability of the 15Kh2NMFA Pressure-Vessel Steel.
N. N. Zorev, V. A. Tsykanov, and O. M. Vishkarev. 1979, 17p
In Russian.
U.S. Sales Only.

Considered are the methods for irradiation of the reactor materials. The possibility is shown for substantially precise control (290+-15 deg C) of the irradiation temperature and maintaining it at a given level as well as for achieving a necessary fluence of 7x10 exp 19 n/cm exp 2 (E>0.8 MeV). The validity of the data on radiation resistance of 15 Kh2NMFA steel (of both commercial and laboratory founding) taken as an example has been proved according to the results from multiple irradiations in SM-2 reactor. Based on numerous experiments the relations of increase in brittle-ductile transition temperature (delta Tsub(f)) for 15Kh2NMFA steel with normal and lower residual element contents to fluence and temperature have been found. The quanitative dependence of delta Tsub(f) on residual element contents (P, Cu, As) in 15Kh2NMFA steel has also been obtained. (Atomindex citation 11:508114)

N80-29432/5 PC **A07**/MF **A01**
George Washington Univ., Washington, DC. School of Engineering and Applied Science.
Statistical Aspects of Carbon Fiber Risk Assessment Modeling.
D. Gross, D. R. Miller, and R. M. Soland. Jul 80, 127p NASA-CR-159318
Grant NSG-1556

The probabilistic and statistical aspects of the carbon fiber risk assessment modeling of fire accidents involving commercial aircraft are examined. Three major sources of uncertainty in the modeling effort are identified. These are: (1) imprecise knowledge in establishing the model; (2) parameter estimation; and (3)Monte Carlo sampling error. All three sources of uncertainty are treated and statistical procedures are utilized and/or developed to control them wherever possible.

PB80-216567 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Investigation of Boundary and Volume Diffusion by the Method of Beta-Radiation Absorption,
V. T. Borisov, V. M. Golikov, and G. V. Shcherbedinskii. 1979, 42p DMDC-23388, TT-79-58096-B
Trans. of Problemy Metallovedeniya i Fiziki Metallov (USSR) n5 p383-396 1958. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The diffusion of radioactive iron in iron and iron-3% Si alloys in the temperature range 700 to 890C is reported. An apparatus and technique is described and is based on absorption of the emitted Beta-radiation. Relative contributions of the grain boundaries is given much attention in the experiments. Diffusion parameters for both lattice and grain boundary diffusion are calculated and their dependence on grain size determined. Arrhenius expressions are given for both types of diffusion.

PB80-224959 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Study of the Kinetics of Segregation of Gaseous Impurities Along the Grain Boundaries of the Intermetallic Compounds,
D. P. Shashkov. 1980, 10p DMDC-20698, TT-80-58225
Trans. of Fizika i Khimiya Obrabotki Materialov (USSR) n6 p31-35 1970. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Gas analyses were performed on the intermetallic compounds Cu4Si, Cu5Si, and Ni3Sn2 after they had been melted under various atmospheres. Specimens were either vacuum melted, air melted, or under an air atmosphere containing water

vapor. Gas analyses were later performed to determine O2, H2, and N2 contents. In all cases, O and H segregated the grain boundaries of Cu3Si and in Cu5Si only O segregated to the boundaries. The segregation of N in Cu3Si and N and O in Cu5si proceeds considerably more slowly. Electron microscopy did not reveal the presence of an excessive number of brittle precipitates along the grain boundaries.

PB80-224967 PC A02/MF A01
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
The Elastic Diffusion of Two Pores in Anisotropic,
M. E. Osinovskii. 1972, 20p TT-72-58030(C), DMDC-16945-C
Trans. of Akademiya Nauk URSR, Kiev. Instytut Metallofizyky, v25 p55-67 1968. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The equations and boundary conditions for the elastic diffusion of two pores in an anisotropic crystal are formulated with an outline of the solution of these equations and presented in this paper. Also, the methods used in the solution of the equations of the elasticity theory applied to the problem are spelled out in detail.

PB80-225014 PC A02/MF A01
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Theory of the Method for Determining the Diffusion Coefficient at Grain Boundaries (K Teorii Metoda Opredeleneya Kozffitsienta Diffuzii po Granitsam Zeren Metallov),
V. T. Borisov, and B. Ya. Lyubov. 1980, 17p DMDC-11504, TT-74-53213
Trans. of Fizika Metallov i Metallovedenie (USSR) n1 p298-302 1955. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

A strictly mathematical basis for determining the grain boundary diffusion coefficient is developed. It is based on the model of Fisher (Jnl. of Appl. Physics 1951, 22, 74). An equation for the grain bdy. diff. coeff. is given along with the necessary boundary conditions for its application.

PB80-850399 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Recycling Zinc. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jul 80, 55p NERACEDBNT0291
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss various methods of recycling zinc from shredded automobiles and other forms of metallic wastes. Among the methods discussed are cryogenics, hydrometallurgical separation, and magnetic fluids. (Contains 043 citations.)

PB80-852247 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Recycling Zinc. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 19p
NERACUSGNT0291
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the process, energy use patterns, trends, prospective sources, etc. of zinc recycling. (Contains 010 citations.)

PB80-852841 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Dispersion Strengthening and Hardening of Aluminum. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 41p NERACEI NT0885
Sponsored in part by National Technical Information Service, Springfield, VA.

Citations in this bibliography cover the ability of aluminum alloys to be hardened and or strengthened by proper metallurgical processing. This involves particular alloys and unique thermal, aging or thermomechanical treatments. Emphasis is on processing methods, mechanical properties, microstructure analysis and particles used in forming the crystal formations required. (Contains 046 citations.)

PB80-854862 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Carbonitrided and Carbonitriding Ferrous Metals. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 79p NERACEI NT0888
Sponsored in part by National Technical Information Service, Springfield, VA.

Surface properties of ferrous metals can be vastly improved by heat treatment in an atmosphere which introduces carbon and nitrogen into the alloy. Technical papers contained in this bibliography provide data on this surface-hardening process. Topics covered include material properties, metallurgical analyses, processing methods, new technology, test results related to wear, hardness, fatigue or specific applications and low-temperature carbonitriding. (Contains 071 citations.)

PB80-856156 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Recycling Metal Scrap. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 54p NERACEI NT0990
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the processes, techniques, and benefits of recycling metal scraps. Also included is an analysis of the current global metals recycling trends. (Contains 048 citations.)

PB80-856230 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Metals Recovery From Wastes. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 65p NERACEDBNT0995
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the recovery and recycling of ferrous and nonferrous metals from various industrial and municipal wastes are contained in this retrospective bibliography. (Contains 076 citations.)

PB80-856248 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Metals Recovery From Wastes. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 94p NERACEI NT0995
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the recovery and recycling of ferrous and nonferrous metals from various industrial and municipal wastes are contained in this retrospective bibliography. (Contains 088 citations.)

PB80-857592 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Yttrium Applications. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 77p NERACEDBNT0706
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the separation or isolation of yttrium and its applications in alloys and other types of compounds are included in this retrospective bibliography. (Contains 035 citations.)

PB80-857733 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Ferromagnetic Materials. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 132p
NERACIAANT0690
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the anomalies, various spectra, anisotropies, and other properties of ferromagnetic materials. (Contains 076 citations.)

PB80-857741 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Ferromagnetic Materials. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 203p
NERACUSGNT0690
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the anomalies, anisotropies, and other properties of ferromagnetic materials. (Contains 128 citations.)

PB80-857758 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Ferromagnetic Materials. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 199p
NERACEDBNT0690
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the anomalies, anisotropies, and other properties of ferromagnetic materials. (Contains 141 citations.)

PB80-857766 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Ferromagnetic Materials. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 49p NERACEI NT0690
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the anomalies, anisotropies, and other properties of ferromagnetic materials. (Contains 031 citations.)

PB80-858434 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Yttrium Applications. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 64p NERACUSGNT0706
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the separation or isolation of yttrium and its applications in alloys and other tupes of compounds are included in this retrospective bibliography. (Contains 041 citations.)

PB80-858442 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Yttrium Applications. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 81p NERACEI NT0706
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the separation or isolation of yttrium and its applications in alloys and other

tupes of compounds are included in this retrospective bibliography. (Contains 060 citations.)

SAND-80-6012 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Method of Safe Aluminothermic Production of Pure Metals Translation.
J. Sacek. Jun 80, 6p
Contract AC04-76DP00789
C Czech Patent No. 108.235 1963.

A method of safe aluminothermic production of pure metals, characterized by the fact that a smooth reaction is conducted in a rotating reaction vessel (8) located in a closed space (1) by a steady introduction of the aluminothermic mixture through an elongated opining (0) in the ceiling of the closed space. (ERA citation 05:030857)

SAND-80-6013 PC **A02**/MF **A01**
Temperature of an Aluminothermic Process as a Function of Heat Evolved Per Kilogram.
V. A. Bogolyubov. 1957, 20p
Contract AC04-76DP00789
A, Stal, 17 P531-535 1957.

The theoretically established linear relationship between the temperature and the heat evolved per kilogram (kilogram heat) of an aluminothermic process was confirmed by using a tungsten-molybdenum thermocouple to investigate the temperature of aluminothermic production of thermite iron and a calorimeter to investigate the heat change of the process. This relationship may be used in practice for quick calculation of the temperature of an aluminothermic process. (ERA citation 05:030858)

SGAE-3013 PC **A07**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Characterization of Carbides Formed in Carburized Austenitic Fe-Cr-Ni-Alloys.
P. A. J. Peignier, and H. P. Degischer. Dec 78, 128p ME-152/78
In German.
U.S. Sales Only.

Carburization experiments with solid carbon source were carried out with austenitic, experimental Fe-Cr-Ni-alloys at 864 exp 0 C/53 h in Ar-atmosphere. The penetrating carbon forms carbides within the matrix, which were investigated by selected area electron diffraction and X-ray analysis. Transmission electron micrographs of extraction replicas and optical metallography revealed the shape, the size and the distribution of the precipitates. Electronbeam microanalysis was used to determine metal contents of some inclusions and to register redistribution of the matrix components. Thermodynamic calculations are compared with the experimental results. At the interface between specimen and carbon source (Fe, Cr) sub 7 C sub 3 is formed. The iron content of these carbides was found to be proportional to the iron concentration in the matrix. In addition Cr sub 3 C sub 2 appeared on the specimen of 15Fe/15Cr/70Ni. The nickel-rich alloys showed a decrease in chromium concentration towards the interface. A similar gradient was found within the grains towards grainboundaries. Alloys 60 and 70Fe/15Cr/Ni carburize along the grain boundaries by relatively thick M sub 23 C sub 6 -inclusions. Within the alloys with higher Ni-content (50 and 35Fe/15Cr/Ni) platelike precipitates of M sub 23 C sub 6 and M sub 2 (C,N) dominate, whereas the grain boundaries of 15 Fe/15Cr/70Ni are decorated by M sub 7 C sub 3 -carbides. The precipitates within the grain reach high density within 35 and 15Fe/15Cr/Ni and are almost all of the type Cr sub 2 (C,N) as well as in 50Fe/15Cr/35Ni. The nitrogen content within these carbo-nitrides decreases towards the surface where almost pure Cr sub 2 C might exist. Together with the known carbon contents a discussion of the carburizing mecanisms is added: interface reactions, diffusion of carbide forming elements, solubility of carbon, carbide formation along the grain boundaries and within the grains. (Atomindex citation 11:508008)

UCID-18729 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Experimental Program to Study the Mechanical Properties of Beryllium. A Status Report.
D. J. Steinberg. 1 Jul 80, 8p
Contract W-7405-ENG-48

Mechanical properties of Be were studied by launching flyers by a gas gun to strike a Be target backed by a LiF window. The motion of the Be-LiF interface was monitored. The effect of the yield strength of the LiF was negligible. (ERA citation 05:029298)

Y/AJ-227 PC **A03**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Development of a Rotating Cathode Amalgammaker.
F. A. Schimmel. 14 Jul 80, 34p
Contract W-7405-ENG-26

A mercury cell with vertical rotating cathodes for the preparation of lithium amalgam was developed from bench-scale to pilot-plant size. Design and operating results are reported. (ERA citation 05:030854)

11G. Miscellaneous Materials

PB80-815855 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Ablation and Ablative Materials. 1974-July, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1974-Jul 80,
Samuel C. Mauk. Sep 80, 70p
Supersedes NTIS/PS-79/0833/8. Sponsored in part by National Technical Information Service, Springfield, VA.

These citations from the international literature concern various aspects of ablation and ablative materials. Included are articles covering aerodynamic heating, heat shielding, radiative heat transfer, atmospheric entry, re-entry effects, re-entry shielding and re-entry vehicles. Ablation of meteorites is also covered. Articles concerning various ablative materials are included. (This updated bibliography contains 290 citations, 90 of which are new entries to the previous edition.)

PB80-850498 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Diamond Manufacturing. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 66p NERACEI NT0354
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the processes involved in the production of synthetic diamonds and diamond tooling. Also described are some techniques for the fabrication of optical components by diamond turning. (Contains 070 citations.)

PB80-855877 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
High Temperature Insulation. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 55p NERACEI NT0376
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwdie information are cited on high temperature thermal and electrical insulators. Investigations and applications of high temperature insulators, covering, electrical generators, nuclear power plants, cables, spacecraft heat shields and others using carbon, nylon fibers, PVC, porcelain, ceramics, silica and others as insulation materials. (Contains 042 citations.)

PB80-855893 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
High Temperature Insulation. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jul 80, 40p NERACEDBNT0376
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information is cited on high temperature thermal and electrical insulators. Investigations and applications of high temperature insulators, covering, electrical generators, nuclear power plants, cables, spacecraft heat shields and others using carbon, nylon fibers, PVC, porcelain, ceramics, silica and others as insulation materials. (Contains 032 citations.)

PB80-856164 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tanning Process. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 97p NERACEI NT0966
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the processes involved in the tanning of leather. Also included is a description of the industrial aspects of tanning, and the development of tanning techniques. (Contains 095 citations.)

PB80-856172 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tanning Process. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 74p
NERACUSGNT0966
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the processes involved in the tanning of leather. Also included is a description of the industrial aspects of tanning, and the development of tanning techniques. (Contains 059 citations.)

PB80-857832 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Materials. November, 1978-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Nov 78-Jun 80,
John H. Frey. Jun 80, 192p NERACEI NT0807
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the structure, measurement, and basic parameters of magnetic materials. Citations include descriptions of superconducting materials, magnetic field equations, bubble circuits, hyperfine fields, design criteria, and frequency characteristics of magnetic materials, and also as applied to compounds, alloys, and rare earths. (Contains 194 citations.)

PB80-859200 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Graphite Intercalation Compounds. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 30p
NERACUSGNT0322
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the properties, preparation, and various applications of graphite intercalation compounds and their use in the search for high conductivity compounds. (Contains 020 citations.)

11H. Oils, Lubricants, and Hydraulic Fluids

AD-A087 955/1 PC **A02**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate

A Solid Film Lubricant Applications Guide for the F-18 Finish Specification.
Final rept.,
Vincent Novielle. 21 May 80, 19p Rept no. NADC-80028-60

Information is provided on the application of bonded solid film lubricants as a guide for the preparation of an F-18 finish specification. Three major areas are covered which include: (1) corrosion protection relationships, (2) compatibility with liquid lubricants and (3) stripping/rework capability. Requirements for future R&D needs in the area of solid film lubrication are outlined. (Author)

N80-29735/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Film Thickness for Different Regimes of Fluid-Film Lubrication.
B. J. Hamrock. 1980, 14p NASA-TM-81550, E-508
Presented at Lecture Series at Lulea, Sweden, 24 Jul. - 16 Aug. 1980.

Film thickness equations are provided for four fluid-film lubrication regimes found in elliptical contacts. These regimes are isoviscous-rigid; viscous-rigid; elastohydrodynamic lubrication of low-elastic-modulus materials (soft EHL), or isoviscous-elastic; and elastohydrodynamic lubrication of high-elastic-modulus materials (hard EHL), or viscous-elastic. The influence or lack of influence of elastic and viscous effects is the factor that distinguishes these regimes. The results are presented as a map of the lubrication regimes, with film thickness contours on a log-log grid of the viscosity and elasticity for three values of the ellipticity parameter.

PB80-850688 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Solid Lubricants: Molybdenum Disulfide. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Aug 80, 111p
NERACIAANT0274
Sponsored in part by National Technical Information Service, Springfield, VA.

As a dry, solid lubricant, molybdenum disulfide has found many useful applications. It can be combined with oils or greases, applied by coating processes, burnished into a surface or used as a filler in fabricating plastic and other materials. Articles included in the listed citations deal with sliding friction, wear, material properties and behavior of this lubricant. Various applications and environments are covered including bearings and gears. (Contains 150 citations.)

PB80-853062 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Sliding Contact Lubricants. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 30p
NERACUSGNT0333
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the behavior and properties of sliding contact lubricants. Also included is a description of lubrication mechanisms, and mechanical component failure prediction for specific contacts. (Contains 017 citations.)

PB80-853161 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Synthetic Lubricants. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 172p
NERACEDBNT0298
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the testing, development, and application of various synthetic lubricants. Also included is a description of the production of synthetic oil, and crude oils. (Contains 067 citations.)

PB80-853179 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Synthetic Lubricants. February, 1971-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Feb 71-Jun 80,
Howard L. Ogushwitz. Jun 80, 188p NERACEI NT0298
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the testing, development, and application of various synthetic lubricants. Also included is a description of the production of synthetic oil, and crude oils. (Contains 200 citations.)

PB80-853187 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Synthetic Lubricants. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 140p
NERACUSGNT0298
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the testing, development, and application of various synthetic lubricants. Also included is a description of the production of synthetic oil, and crude oils. (Contains 135 citations.)

PB80-853195 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Synthetic Lubricants. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jun 80, 32p
NERACIAANT0298
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the testing, development, and application of various synthetic lubricants to such areas as, gas-turbine engines, aircraft turbine engines, and other sliding systems. (Contains 067 citations.)

PB80-853971 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tribology. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Aug 80, 161p
NERACIAANT0676
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information is cited on tribology between various substrates. Studies to solve the different tribology problems in adhesion friction, wear and lubrication are also discussed. (Contains 105 citations.)

PB80-853989 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tribology. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Aug 80, 65p
NERACUSGNT0676
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information is cited on tribology between various substrates. Studies to solve the different tribology are also discussed. (Contains 035 citations.)

PB80-853997 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tribology. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Aug 80, 189p NERACEI NT0676
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information is cited on tribology between various substrates. Studies to solve the different tribology problems in adhesion friction, wear and lubrication are also discussed. (Contains 141 citations.)

PB80-857543 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Solid Lubricants. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 156p
NERACIAANT0693
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the behavior, performance, and application of various types of solid lubricants such as graphite fiber-polyimide composites, plastic lubricants, and molybdenum disulfide. (Contains 100 citations.)

PB80-859275 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Graphite in Lubrication. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
T. David Kennedy. Aug 80, 100p
NERACIAANT0273
Sponsored in part by National Technical Information Service, Springfield, VA.

Graphite and graphite fluoride are well known solid lubricants used for applications where dry lubricants are required or in conjunction with oils or greases to improve lubrication. Research reports on related topics are cited and should provide valuable assistance in deciding upon the value of graphite as a lubricant. In the form of a fiber graphite is used in manufacturing composite materials with self-lubricating properities. Several articles on this subject are included as well as graphite as a filler in various bearing materials. (Contains 135 citations.)

PB80-859283 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Graphite in Lubrication. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Aug 80, 54p
NERACUSGNT0273
Sponsored in part by National Technical Information Service, Springfield, VA.

Graphite and graphite fluoride are well known solid lubricants used for applications where dry lubricants are required or in conjunction with oils or greases to improve lubrication. Research reports on related topics are cited and should provide valuable assistance in deciding upon the value of graphite as a lubricant. In the form of a fiber graphite is used in manufacturing composite materials with self-lubricating properities. Several articles on this subject are included as well as graphite as a filler in various bearing materials. (Contains 085 citations.)

PB80-859291 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Graphite in Lubrication. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Aug 80, 69p NERACEI NT0273
Sponsored in part by National Technical Information Service, Springfield, VA.

Graphite and graphite fluoride are well known solid lubricants used for applications where dry lubri-

cants are required or in conjunction with oils or greases to improve lubrication. Research reports on related topics are cited and should provide valuable assistance in deciding upon the value of graphite as a lubricant. In the form of a fiber graphite is used in manufacturing composite materials with self-lubricating properities. Several articles on this subject are included as well as graphite as a filler in various bearing materials. (Contains 070 citations.)

PB80-859309 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Molybdenum Disulfide Lubrication. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Aug 80, 76p
NERACUSGNT0274
Sponsored in part by National Technical Information Service, Springfield, VA.

As a dry, solid lubricant, molybdenum disulfide has found many useful applications. It can be combined with oils or greases, applied by coating processes, burnished into a surface or used as a filler in fabricating plastic and other materials. Articles included in the listed citations deal with sliding friction, wear, material properties and behavior of the lubricant. Various applications and environments are covered including bearings and gears. (Contains 070 citations.)

PB80-859317 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Molybdenum Disulfide Lubrication. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 65p NERACEI NT0274
Sponsored in part by National Technical Information Service, Springfield, VA.

As a dry, solid lubricant, molybdenum disulfide has found many useful applications. It can be combined with oils or greases, applied by coating processes, burnished into a surface or used as a filler in fabricating plastic and other materials. Articles included in the listed citations deal with sliding friction, wear, material properties and behavior of the lubricant. Various applications and environments are covered including bearings and gears. (Contains 050 citations.)

11I. Plastics

AD-A088 119/3 PC **A04**/MF **A01**
Pittsburgh Univ PA Dept of Metallurgical and Materials Engineering
Thermomechanical Transitions in Polyphosphazenes.
Interim technical rept.,
I. C. Choy, and J. H. Magill. 8 Aug 80, 54p Rept no. TR-5
Contract N00014-77-C-0310

Unoriented and oriented samples of two phosphazene homopolymers with chemical structure (NPX2) sub n, where X = CF3CH2O and p-CH3C6H4O, and three unfilled and filled alkoxy-type polyphosphazene copolymers, plus one filled aryloxy-type copolymer were examined using a Rheovibron viscoelastometer. Measurements were made from -120 C to temperatures above the T(1) transition of the respective polymers. The effects of orientation and repeated temperature cycling through the T(1) transition temperatures were studied. The overall physical behavior of these polyphosphazenes was dominated by changes that occurred through the primary softening dispersion and the so-called mosomorphic or T(1) transition region. The enthalpy of the T(1) transition, and the T(1) temperature were investigated by differential scanning calorimetry (DSC) as a function of temperature cycling through the T(1) region. For instance, the change in enthalpy through the T(1) region is about an order of magnitude larger than it is at Tm for the unfilled polyphosphazene homopolymers. The Tg's of the polyphosphazenes were also determined. Density measurements were made on oriented and unoriented specimens using a floatation method. Although an increase in density (and crystallinity) was observed when specimens were cycled through the T(1) transition, no significant difference in density was found between oriented and unoriented materials. Some discussion of the molecular origin of the T(1) mesophase transition is included. (Author)

AD-A088 159/9 PC **A02**/MF **A01**
Case Western Reserve Univ Cleveland OH Dept of Chemistry
Studies of a Series of Halo Aluminum, Gallium, and Indium Phthalocyanines.
Technical rept.,
John P. Linsky, Thomas R. Paul, Ronald S. Nohr, and Malcolm E. Kenney. 24 Jul 80, 23p Rept no. TR-6
Contract N00014-75-C-0693

Physical and chemical studies have been carried out on the series of phthalocyanines AlPcF, AlPcCl, AlPcBr, AlPcI, GaPcF, GaPcCl and InPcCl. It is concluded on the bases of mass spectroscopic, infrared, microscopic, x-ray, and other data collected in these studies that AlPcF and GaPcF are polymeric and have (M-F) sub x backbones, It is further concluded that the remaining compounds are non-polymeric. (Author)

AD-A088 213/4 PC **A03**/MF **A01**
Northwestern Univ Evanston IL Materials Research Center
Thermally Stimulated Discharge Current Analysis of Epoxy Resins.
Annual rept. Feb 79-Jan 80,
T.-D. Chang, H. Ueda, S. H. Carr, and J. O. Brittain. 30 Jul 80, 36p Rept no. TR-2
Contract N00014-78-c-0276

Network polymers resins have been prepared from selected binary combinations of diglycidl ether of butanediol or diglycidl ether of bisphenol A with ethylene diamine, diethylene triamine, diaminodiphynyl methane, or diaminodiphenyl sulfone. Thermally stimulated discharge current analyses were performed on these materials in an effort to elucidate significant molecular motions through the temperature range, approximately 80 K to 460 K. Assignments of dielectrically and mechanically active loss processes to motions involving penyl groups, pendant hydroxyl groups, or aliphatic backbone segments could be made in cases where there were clear indications based on the temperature-dependence of activation energy. (Author)

AD-A088 225/8 PC **A04**/MF **A01**
De Soto Inc des Plaines IL
High Solids Coating System.
Final rept. 5 Feb 79-Feb 80,
Gretchen L. McKay, and Ashok K. Chattopadhyay. Jun 80, 62p AFWAL-TR-80-4073
Contract F33615-79-C-5007
Continuation of contract F33615-77-C-5101.

This contract research effort, a continuation of a previous Air Force supported contract (F33615-77-C-5101), was directed toward the development of a 65% volume solids, sprayable (airless electrostatic method), polyurethane exterior aircraft coasting meeting MIL-C-83286B performance specifications. A high solids coating can significantly reduce solvent emissions and help the Air Force meet EPA/OSHA requirements for reduced environmental pollution and increased worker safety. One formulation, consisting of a combination of Acryloid AU-568 (oxazolidine), NIAX PCP-0300 (polyol), and Desmodur N-100 (polyisocyanate) was developed under the initial contract and found to exhibit performance properties closely approximating the program goals. During the present contract, this formulation was further evaluated. Attempts to upgrade the properties not meeting the performance specifications were made. Also, new commercially available resins were evaluated for incorporation into the high solids systems. (Author)

AD-A088 299/3 PC **A04**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Materials Science and Engineering
Oxidative Stabilization of Acrylic Fibers. V. The Decoloration Reaction.
Technical rept.,
S. S. Chen, J. Herms, L. H. Peebles, Jr., and D. R. Uhlmann. Aug 80, 72p Rept no. TR-13
Contract N00014-75-C-0542
See also report dated Jan 79, AD-A064 552.

When acrylic fibers are heat treated for various times at 220-250 C, they form dark, insoluble structures of uncertain chemical character which are inert to many strong oxidizing and reducing agents. The heat-treated fibers are, however, rapidly decolored by warm alkaline hypochlorite solutions. When fibers which have undergone short time heat treatment are subjected to the hypochlorite, incubation periods are observed before decoloration is noted; and a swollen acrylic network remains after decoloration is complete. The acrylic network is primarily unreacted precursor units save for a small amount of hydrolyzed material. The decoloration reaction is zero order, indicating a reaction at the surface. Prior to the decoloration reaction, there is a penetration or plasticization of the subsurface material by elements of the solution, as indicated by the presence of chlorine atoms in the interiors of exposed fibers. The rate of the decoloration reaction increases with increasing duration of the stabilization heat treatment. The precise structure of the final material depends therefore on the original fiber composition and the processing variables.

AD-A088 327/2 PC **A06**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Chemistry
Engineering Properties of Multiphase Block Copolymers.
Final rept. 15 Jul 76-30 Apr 80,
Andrew J. Wnuk, Thomas C. Ward, and James E. McGrath. 20 Jul 80, 114p ARO-14072.7-C
Grant DAAG29-76-G-0312

Multiblock (A-B)n copolymers of bisphenol-A polycarbonate and several poly(arylether sulfones) have been investigated. The copolymers were prepared from hydroxyl terminated oligomers by an interfacial technique which utilized phosgene as the coupling agent. Characterization of the oligomers and copolymers included end group analysis, UV-Visible Sepctroscopy, membrane osmometry, and gel permeation chromatography. (Author)

AD-A088 488/2 PC **A02**/MF **A01**
Arizona Univ Tucson Dept of Chemistry
New Processable Poly(ether-Keto-Sulfone)s, Poly(arylene Sulfone)s, and Polyesters Curable by Intramolecular Cyclization. XVII.
A. Somers, and C. S. Marvel. 16 Aug 79, 13p
AFOSR-TR-80-0602
Grant AFOSR-77-3112
Pub. in Jnl. of polymer Science: Polymer Chemistry Edition, v18 p1511-1521 1980.

No abstract available.

AD-A088 538/4 PC **A03**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
A Photoelastoplastic Study of Stress Concentration Factors and Residual Stresses in Two Notched Specimens of Polycarbonate Material.
Technical rept.,
Y. F. Cheng. Jul 80, 30p ARLCB-TR-80025, AD-E440 084

A photoelastoplastic study on stress concentrations, in elastic as well as in elastoplastic states, in a C-shaped specimen and a compact tensile specimen of polycarbonate material has been made. The principles of the experimental method are outlined, equations for nominal stresses are given, and stress concentration factors are determined. Residual stresses after unloading are calculated by making the usual assumption that unloading is an elastic process. In the elastic state, stress concentration factors are readily applicable to specimens of any material with similar geometry and loading. In the elastoplastic state, it requires the similarity of stress-strain relation between model and prototype materials.

BDX-613-2354 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.

Evaluation of Improved Polyamides.
R. J. Hishaw. Jun 80, 22p
Contract AC04-76DP00613

Three polyamides, nylon 11, nylon 12, and a transparent nylon, were evaluated by physical testing, characterization and analytical methods, and injection molding. None of the materials proved to be clearly superior to the others. Results of the evaluation will be used to determine applications for the materials in future production programs. (ERA citation 05:030938)

BDX-613-2394 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Moisture Penetration Evaluation of Polystyrene Bead Foam as an Encapsulant for Electronic Packages.
G. D. Swanson. Jun 80, 19p
Contract AC04-76DP00613

Discs of polystyrene bead foam were used to measure resistance to high-pressure moisture penetration. Densities of 0.2, 0.3, 0.4, 0.5, and 0.6 g/cm exp 3 processed at various fusion times and temperatures were tested. Only three fusion conditions for 0.6 g/cm exp 3 density were impervious to moisture penetration at 1724 kPa for 24 hours or more. (ERA citation 05:030939)

BDX-613-2405 PC **A04**/MF **A01**
Bendix Corp., Kansas City, MO.
Test Methods for the Dynamic Mechanical Properties of Polymeric Materials. Final Report.
G. K. Baker. Jun 80, 73p
Contract AC04-76DP00613

Various test geometries and procedures for the dynamic mechanical analysis of polymers employing a mechanical spectrometer have been evaluated. The methods and materials included in this work are forced torsional pendulum testing of Kevlar/epoxy laminates and rigid urethane foams, oscillatory parallel plate testing to determine the kinetics of the cure of VCE with Hylene MP, oscillatory compressive testing of B-3223 cellular silicone, and oscillatory tensile testing of Silastic E and single Kevlar filaments. Fundamental dynamic mechanical properties, including the storage and loss moduli and loss tangent of the materials tested, were determined as a function of temperature and sometimes of frequency. (ERA citation 05:030936)

BDX-613-2408 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Phenolic Resin Syntactic Foams.
H. M. McIlroy. Jun 80, 21p
Contract AC04-76DP00613

Syntactic foams were prepared from blends of six phenolic resins and carbon microbubbles. The compressive strength of the phenolic resin foams is equivalent to the strength of foams made from a polyimide resin. Ammonia evolved during the cure diffuses rapidly and is not bound by the foam. (ERA citation 05:030937)

CERN-79-08 PC **A11**/MF **A01**
European Organization for Nuclear Research, Geneva (Switzerland).
Compilation of Radiation Damage Test Data. II. Thermosetting and Thermoplastic Resins.
H. Schoenbacher, and A. Stolarz-Izycka. 15 Aug 79, 228p
In English, French.
U.S. Sales Only.

This report summarizes radiation damage test data on thermosetting and thermoplastic resins, with the main emphasis on epoxy resins used for magnet coil insulations. Also, other materials such as polyesters, phenolics, polyurethanes, silicones, etc., are represented. The materials have been irradiated in a nuclear reactor to integrated absorbed doses between 5x10 exp 6 Gy and 1x10 exp 8 Gy. The mechanical properties, e.g. the flexural strength, deflection at break, and tangent modulus of elasticity, have been measured on irradiated and non-irradiated samples. The results are given as variation of these parameters versus absorbed dose and are presented in the form of tables and graphs. The tested materials are catalogued in alphabetical order. (Atomindex citation 11:508102)

DOE/ER/01198-1309 PC **A07**/MF **A01**
Stanford Univ., CA. Center for Materials Research.
Report of the Panel on New Materials for the Council on Materials Science, United States Department of Energy.
Nov 79, 141p
Contract AC02-76ER01198

Research is summarized concerning inorganic synthesis, new polymeric materials, intermetallic compounds, amorphous solids, thin films, solid state ionics, catalysis, and semiconductors. (ERA citation 05:029277)

DOE/ER/04440-7 PC **A02**/MF **A01**
Illinois Inst. of Tech., Chicago.
Diffusion Mechanisms and Degradation of Environmentally Sensitive Composite Materials. Progress Report, July 1, 1979-June 30, 1980.
L. J. Broutman. Apr 80, 15p
Contract AS02-77ER04440

Progress not previously discussed in reports COO-4440-4 through COO-4440-6 is summarized. Moisture diffusion results in unstressed epoxy samples obtained last year (below 70 exp 0 C) suggested the presence of a 2-phase structure in the cured epoxy resin. Chemical etching studies initiated this year further confirm the existence of this structure. Also, diffusion results obtained at 95 exp 0 C demonstrate a reversal in the trend of diffusivity versus crosslink density as observed on the same samples last year. A damage mechanism at this temperature is proposed to explain the results. Initial results on stressed epoxy samples show the inadequacy of the current test fixtures; as a result, new fixtures have been designed to eliminate stress relaxation problems due to swelling and creep of the resin samples during the experiment. (ERA citation 05:030934)

N80-29501/7 PC **A04**/MF **A01**
Siemens A.G., Munich (Germany, F.R.). Geschaeftsbereich Weitverkehrssysteme.
Investigation of Carbon Fiber Reinforced Plastics for High Frequency Components.
Final Report.
W. Altmann, H. G. Kerzl, and O. Schweizer. Oct 79, 51p BMFT-FB-W-79-16
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

High frequency components used in satellite subunits are usually made of metal alloys (e.g., Invar) to meet requirements with respect to thermal characteristics. The disadvantage of these materials is the relatively high specific weight. An investigation to determine whether a suitable alternative material is available for the manufacture of diplexer filters for satellite applications was conducted. When initial tests with carbon fiber reinforced plastics from Canada showed satisfactory results, products on the German market were studied to determine their suitability. Analysis of the mechanical properties and chemical characteristics of available domestic and foreign materials show that German material in its present stage of development is satisfactory for filter construction. Nonetheless, the poor reproducibility of thermal shock test results, interpreted from holographic interferometric measurements, indicates the need for further improvement of deformation properties.

PAT-APPL-6-175 454 PC **A02**/MF **A01**
Department of the Navy Washington DC
Method of Synthesizing Resin Prepolymers.
Patent Application,
Carl J. Garvin, and Teddy M. Keller. Filed 5 Aug 80, 9p AD-D007 412/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved method of synthesizing bisorthodinitriles where R is an aliphatic or aromatic radical is described it involves dissolving the reactants in a dipolar aprotic solvent such as dimethylformamide, and heating the mixture to reflux until the completion of the reaction. The usage of such solvents permits the reaction to be completed at least ten times as fast as the prior-art method, while the volume of solvent used is also reduced by a factor of ten.

PATENT-4 209 458 Not available NTIS
Department of the Navy Washington DC
Fluorinated Phthalonitriles.
Patent,
Teddy M. Keller, and James R. Griffith. Filed 4 Apr 79, patented 24 Jun 80, 5p AD-D007 433/6, PAT-APPL-6-026 863
Supersedes PAT-APPL-6-026 863, AD-D006 034.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A fluorinated phthalonitrile is prepared by reacting 4-iodophthalonitrile with the appropriate diiodide in the presence of activated copper in a dipolar aprotic solvent. Heating this phthalonitrile to a temperature from about its melting point to about 285 C. produces a polyphthalocyanine resin. If a salt or metal is added prior to the heating, a metal or salt-coordinated polyphthalocyanine is produced. Polyphthalocyanines are useful in coatings, laminates, filament windings, castings, and structural composites.

PB80-852536 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Decomposition and Corrosion of Polymeric Materials. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Lawrence H. Marcus. Jun 80, 100p
NERACIAANT0550
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports which deal with corrosion, decomposition and degradation of plastics and polymeric materials. Included are studies, kinetics and mechanisms of thermal decomposition, photodegradation, mechanical degradation, stress corrosion and oxidation. (Contains 129 citations.)

PB80-852544 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrically Conductive Plastics. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 73p
NERACEDBNT0399
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports which deal with the preparation, properties and behavior of electrically conductive polymers. Applications include solar cells. (Contains 058 citations.)

PB80-852551 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrically Conductive Plastics. January, 1977-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 77-Jun 80,
Lawrence H. Marcus. Jun 80, 204p NERACEI NT0399
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports which deal with the preparation, properties and effects and influences on the conductivity of electrically conductive plastics. (Contains 180 citations.)

PB80-853708 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Acrylic Glass. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 49p NERACUSGNT0424
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on the studies of composites and formulations of acrylic glass. Fabrication techniques, applications testing, and evaluations of acrylic glass are also included. (Contains 031 citations.)

PB80-853716 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Acrylic Glass. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 121p NERACEI NT0424
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on the studies of composites and formulations of acrylic glass. Fabrication techniques, applications testing, and evaluations of acrylic glass are also included. (Contains 096 citations.)

PB80-857469 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Decomposition of Polymers. January, 1979-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 79-Jun 80,
Lawrence H. Marcus. Jun 80, 224p NERACEI NT0550
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports which deal with corrosion, decomposition and degradation of plastics and polymeric materials. Included are studies, kinetics and mechanisms of thermal decomposition, photodegradation, mechanical degradation, stress corrosion and oxidation. (Contains 200 citations.)

11J. Rubbers

PB80-225402 Not available NTIS
National Bureau of Standards, Washington, DC.
Some Methods of Measurement of an Elastic Strain-Energy Function of the Valanis-Landel Type.
Final rept.,
E. A. Kearsley, and L. J. Zapas. 1980, 18p
Pub. in Jnl. of Rheology 24, n4 p483-500 1980.

For some pure elastomers, the strain-energy function can be expressed as the sum of three identical functions of the principal stretch ratios, that is, the strain energy is of the Valanis-Landel form. Methods of measuring this function are derived and demonstated. Examples are given of evaluation from extension and compression (biaxial extension) and from torsion of a cylinder. The character of the strain-energy function about the undeformed state is examined in detail.

PB80-855760 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Reaction Injection Molding of Elastomers. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 103p NERACEI NT0904
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on reaction injection molding of filled and unfilled materials such as urethane, epoxy, polyester and nylon. Various machinery and equipment for reaction injection molding techniques are also included. (Contains 084 citations.)

PB80-855976 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Antioxidants and Stabilizers for Rubber. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 87p NERACEI NT0924
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports covering antioxidents and stabilizers for rubber, both natural and synthetic, which provide protection from radiation, heat, light and aging. (Contains 084 citations.)

11K. Solvents, Cleaners, and Abrasives

PAT-APPL-6-172 848 PC **A02**/MF **A01**
Department of the Navy Washington DC
Method and Composition for Cleaning Metal Surfaces.
Patent Application,
Ramanathan Panayappan, and David L. Venezky.
Filed 25 Jul 80, 9p AD-D007 419/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method of cleaning metal surfaces, particularly irregularly shaped metal surfaces such as exist on a ship, wherein a thick aqueous solution of a water soluble polymer, preferably polyvinylpyrrolidone (PVP), and a chelating agent, is applied to a rusty metal surface as a thick paste, which gradually hardens into an encapsulating film during cleaning. After cleaning is complete, the film and the corrosion products are easily peeled from the clean surface and can be disposed of as solid waste. (Author)

11L. Wood and Paper Products

AD-A088 412/2 PC **A03**/MF **A01**
Army Armament Research and Development Command Dover NJ Large Caliber Weapon Systems Lab
Woodpulp Crystal Structure and Its Effect on Nitrocellulose Physical Properties.
Technical rept.,
H. J. Prask, C. S. Choi, R. Strecker, and E. Turngren. Sep 80, 34p ARLCD-TR-79031, AD-E400 468

The analysis of cellulose properties as determined by X-ray diffraction is described in this report. Results for several cellulose samples - both pulp and linter - are presented. A preliminary correlation between the measured properties of cellulose with properties of cellulose nitrate prepared therefrom is suggested.

PB80-216617 PC **A05**/MF **A01**
Alabama Univ., University. Bureau of Engineering Research.
Chemicals from Wood by Organic Solvent Delignification.
Interim rept.,
Gary C. April, Razia Bharoocha, Thomas Burton, Steven Hansen, and John McGee. Jul 80, 97p BER-256-124, NSF/RA-800159
Grant NSF-AER78-02651

This report reviews the experimental application of organic solvent pulping technology to obtain chemicals from southern woods. Batch delignification studies are presented of Southern Yellow Pine (soft wood) and Sweet Gum (hard wood) using aqueous n-butanol, ethanol, and phenol solutions at temperatures between 135C and 205C. Temperature, catalyst type and concentration, wood type and treatment method are some of the variables that were tested. Results from Southern Yellow Pine pre-treatment studies using water are reported and rates of hemicellulose and beta-cellulose hydrolysis are determined and compared with organosolv treatment results. The use of semi-batch pulping methods to more clearly elucidate rate behavior and solvent selectivity is noted. Also presented is a kinetic analysis of batch and semi-batch results. Both delignification and pulp loss are described by first order reaction kinetics, results generally agreeing with those reported in the literature. Bulk delignification reaction rates for the first step of the process are faster than those for the second step. General trends for both steps agree with previously established values for similar wood types and solvents.

PB80-222979 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
The Effect of Flame-Retardant Treatments on Some Mechanical Properties of Wood.
Current papers,
E. H. Adams, G. L. Moore, and J. D. Brazier. c1979, 15p CP-8/79

The effect of a number of inorganic salt flame-retardant treatments on the mechanical properties of Scots pine wood samples is examined. It is shown that structural performance is reduced as the temperatures used for kiln drying after treatment are raised. It is suggested that salt flame-retardant treated wood is re-dried at the lowest possible temperature, and that in structural timber an allowance is made for the expected loss in performance.

PB80-227135 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
Field Trials on Preserved Timber Out of Ground Contact.
Current papers,
D. F. Purslow, and N. A. Williams. c1978, 35p CP-78/78

This report describes two different field trials studying the performance of preservative treatments on timber exposed to the weather, but above the ground. Results are presented on the protection afforded against decay, and on the efficiency of water-repellent preservative treatments in controlling the uptake of moisture by the timber. Proposals for a standard field test system are briefly discussed. (Copyright (c) British Crown Copyright.)

PB80-227424 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
Preservative Treatments for Constructional Timber.
Current papers,
R. Cockcroft. c1977, 13p CP-17/77

The paper argues that there is a good economic case for considering wood preservation at the design stage when using constructional timber. It explains when preservation is necessary and defines four hazard categories which have been adopted in the new British Standard BS 5268: Part 5:1977. The questions of how long untreated timber lasts, how it may be preserved and which wood preservatives and methods of treatment are available are dealt with in detail. (Copyright (c) British Crown Copyright.)

PB80-227440 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
A Method of Predicting the Average Life of Field Tests on Preservative-Treated Stakes.
Current papers,
D. F. Purslow. c1977, 12p CP-31/77

This pamphlet presents an analysis of the results of completed field stake tests on untreated and preserved timber, and develops a method of predicting the average life of incomplete stake tests on wood preservatives from the failures that have occurred so far. (Copyright (c) British Crown Copyright.)

PB80-227457 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
The Relations between the Ultimate Tension and Ultimate Compression Strength of Timber and Its Modulus of Elasticity.
Current papers,
W. T. Curry, and A. R. Fewell. c1977, 21p CP-22/77

This report is the second in a series examining the relations between the major strength properties of timber and its modulus of elasticity in bending. Various methods of defining the relations between tension strength and modulus of elasticity, and between compression strength and modulus of elasticity, are examined using the results of tests on samples of European redwood and whitewood. Comparisons based on the strength characteristics of sub-groups of data, chosen to simulate what occurs in machine grading, show that general relations between the two strength properties and modulus of elasticity are best defined by the simple regression equation $f = aE + b$, and the minimum or lower exclusion values of strength are best de-

fined by equations of the form f= a1 Eb1. (Copyright (c) British Crown Copyright.)

PB80-853856 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Manufacturing of Chipboard. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 63p NERACEI NT0590
Sponsored in part by National Technical Information Service, Springfield, VA.

Development and manufacturing of particle board, chip board and flakeboard are cited. Fabrication techniques, economics, woodwastes and structural members of chip board are also included. (Contains 056 citations.)

PB80-855372 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Timber Industry. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jul 80, 68p NERACEDBNT0674
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from sources worldwide are cited concerning the commercialization, industrial application, and technology of the Timber Industry, which includes wood products and the pulp and paper industries. Citations discuss appropriate technologies from some specific areas; wood as a fuel and a renewable resource; and the utilization and conservation of the forest and its biomass. (Contains 051 citations.)

PB80-860026 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Timber Industry. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 90p NERACUSGNT0674
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the commercialization, industrial application, and technology of the timber industry, which includes wood products and the pulp and paper industries. Citations discuss appropriate technologies for some specific areas; wood as a fuel and renewable resource; and the utilization and conservation of the forest and its biomass. (Contains 082 citations.)

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A087 555/9 PC **A02**/MF **A01**
Stanford Univ CA Systems Optimization Lab
Methods for Large-Scale Nonlinear Optimization.
Technical rept.,
Philip E. Gill, Walter Murray, Michael A. Saunders, and Margaret H. Wright. May 80, 25p
SOL-80-8, ARO-16470.13-M
Contracts DAAG29-79-C-0110, N00014-75-C-0267
Presented at the SIAM Conference: Electric Power Problems: the Mathematical Challenge, Seattle, Mar 80. Sponsored in part by Contracts DE-AC03-76SF00326 and DE-AT03-76ER72018.

The application of optimization to electrical power technology often requires the numerical solution of systems that are very large and possibly non-differentiable. A brief survey of the state of the art of numerical optimization is presented in which those methods that are directly applicable to power system problems will be highlighted. The areas of current research that are most likely to yield direct benefit to practical computation are identified. The paper concludes with a survey of available software. (Author)

AD-A087 556/7 PC **A03**/MF **A01**
Stanford Univ CA Systems Optimization Lab
Aspects of Mathematical Modeling Related to Optimization.
Technical rept.,
Philip E. Gill, Walter Murray, Michael A. Saunders, and Margaret H. Wright. May 80, 35p
SOL-80-7, ARO-16470.12-M
Contracts DAAG29-79-C-0110, DE-AC03-76SF00326
Sponsored in part by Contract DE-AT03-76ER72018 and Grant NSF-MCS79-26009.

Many practical optimization problems involve mathematical models of complex real-world phenomena. This paper discusses some aspects of modeling that influence the performance of optimization methods. Information and advice are given concerning the construction of smooth models, the transformation of an optimization problem from one category to another, scaling, formulation of constraints, and techniques for special types of models. (Author)

AD-A087 686/2 PC **A03**/MF **A01**
Washington Univ Seattle Dept of Mathematics
Qualitative Matrices: Strong Sign-Solvability and Weak Satisfiability.
Technical rept.,
Victor Klee, and Richard Ladner. May 80, 37p
Rept nos. TR-80-05-01, TR-69
Contracts N00014-76-C-0423, N00014-67-A-0103-0003
Sponsored in part by Grant NSF-MCS77-02474.

The study of 'qualitative' linear systems was suggested by Paul Samuelson in 1947 in his influential book on Foundations of Economic Analysis. The present paper deals with a rather general form of qualitative solvability, of which strong sign-solvability is a special case, and with a closely related notion, weak satisfiability, from propositional logic. The study of strong sign-solvability is reduced to that of s-matrices and a conjecture of T. Gorman on the structure of S-matrices is elucidated. An algorithm is described which uses linear programming methods to recognize S-matrices (and much more general systems) and thus solves this recognition problem is polynomial time. However, this is close to the boundary of NP-completeness, for the closely related problem of recognizing weak satisfiability is shown to be NP-complete. (Author)

AD-A087 946/0 PC **A03**/MF **A01**
Iowa Univ Iowa City Dept of Statistics
On Measuring the Conformity of a Parameter Set to a Trend, with Applications.
Technical rept.,
Tim Robertson, and F. T. Wright. Jul 80, 27p
Rept no. TR-3
Contracts N00014-80-C-0321, N00014-80-C-0322
Prepared in cooperation with Missouri Univ-Rolla. Dept. of Mathematics. Sponsored in part by Grant NSF-MCS78-01514.

Consider the hypothesis H(1):theta(1) > or = theta(2) > or = ... > or = theta(k) regarding a collection, theta(1), theta(2),...theta(k), of unknown parameters. It is clear that this trend is reflected in certain possible parameter sets more than in others. A quantification of this notion of conformity to a trend, which was suggested by Barlow and Brunk (1972), is studied. Applications of the resulting theory to several order restricted hypothesis tests are presented. (Author)

AD-A087 986/6 PC **A02**/MF **A01**
Rice Univ Houston TX Dept of Mechanical Engineering
Sequential Conjugate Gradient-Restoration Algorithm for Optimal Control Problems with Nondifferential Constraints and General Boundary Conditions. Part 2,
A. K. Wu, and A. Miele. 25 Oct 79, 15p AFOSR-TR-80-0576
Grants AFOSR-76-3075, NSF-ENG79-18667
Pub. in Optimal Control Applications and Methods, v1 n2 p119-130 1980. See also Part 1, AD-A087 177.

No abstract available.

AD-A088 016/1 PC **A02**/MF **A01**
Stanford Univ CA Dept of Operations Research
Individual Versus Social Optimization in Commuter Route Choice.
Technical rept.,
Colin E. Bell. Jan 80, 24p Rept nos. TR-89, TR-55
Contract N00014-76-C-0418, Grant NSF-ENG75-14847

Each of N customers must select one of K commuter routes daily. Each commuter route is represented as a series of M/D/1 queuing stations with fixed travel times between stations. In the basic model, all customers arrive at the start of their selected route simultaneously; results which are optimal for the basic model are shown to be nearly optimal under a variety of more realistic arrival assumptions. (Author)

AD-A088 058/3 MF **A01**
Ohio State Univ Columbus Dept of Statistics
Estimation of the P(CS) with a Computer Program. Revision.
Technical rept.,
Edward J. Dudewicz. Jul 80, 17p Rept no. TR-195A
Contract N00014-78-C-0543
Revision of report dated Dec 79.
Availability: Microfiche copies only.

In the area of ranking and selection, recent papers have presented procedures which attempt to allow experimenters to take at least partial advantage of more-favorable configurations of the population parameters (compared to least-favorable configuration). The current paper presents a computer program which allows experimenters to dispense with all of inequalities, an indifference-zone, and known equal variabilities in their assessment of the probability of correct selection. It has additional uses in implementation of recently-proposed sequential adaptive selection procedures. (Author)

AD-A088 065/8 PC **A06**/MF **A01**
Illinois Univ At Urbana-Champaign Dept of Computer Science
Rapid Solution of Finite Element Equations on Locally Refined Grids by Multi-Level Methods.
Interim rept.,
John R. Van Rosendale. May 80, 123p
UIUCDCS-R-80-1021, UILU-ENG-80-1712, AFOSR-TR-80-0591
Grant AFOSR-75-2854

This thesis is concerned with the use of multi-level methods to solve the linear systems arising from finite element discretizations of elliptic equations. In all, three multi-level methods are considered. The first of these is applicable only to quasi-uniform grids, but is simpler than other algorithms considered in previous theoretical work. The other two algorithms are applicable to both quasi-uniform grids, and locally refined grids, those grids on which the size of the largest and smallest elements many differ by an arbitrarily large factor. All three algorithms are asymptotically optimal, producing good solutions in O(N) operations on a finite element grid with N elements. These asymptotically optimal complexity bounds for the last two algorithms are the first such bounds for multi-level methods on locally refined grids. One of these algorithms achieves this O(N) complexity bound under weaker than expected conditions on the dimensions of the finite element spaces used by the algorithm.

AD-A088 071/6 PC **A03**/MF **A01**
Princeton Univ NJ Dept of Statistics
A Robust Confidence Interval for Samples of Five Observations.
Technical rept.,

Karen Kafadar. Nov 79, 27p TR-154-SER-2, ARO-14244.14-M
Grant DAAG29-76-G-0298
Prepared in cooperation with Oregon State Univ.

A robust confidence interval using biweights for the case of five observations is proposed when the underlying distribution has somewhat heavier tails than the Gaussian. The distribution of a t-like statistic is approximated by a Student's t on the nominal four degrees of freedom using different scale factors which depend upon the value of the biweight weights. Results given by Monte Carlo simulations indicate that, even for very high coverage probabilities, the intervals proposed are highly efficient, in terms of the expected length of the confidence interval. (Author)

AD-A088 072/4 PC A02/MF A01
Princeton Univ NJ Dept of Statistics
Formulas for a Two-Sample Monte Carlo Swindle.
Technical rept.,
Karen Kafadar. Nov 79, 13p TR-153-SER-2, ARO-14244.13-M
Grant DAAG29-76-G-0298

In order to obtain accurate estimates of the percentage points of the two-sample t-like statistic, we use a Monte Carlo swindle based on the method of conditional probabilities. The formulas for this implementation are described in this report. (Author)

AD-A088 073/2 PC A04/MF A01
Cincinnati Univ OH Dept of Mathematical Sciences
Numerical Regularization of Ill-Posed Problems.
Final rept.,
C. W. Groetsch. 9 Jul 80, 71p AFOSR-TR-80-0573
Grant AFOSR-79-0059

Contents: Generalized inverses and generalized splines; On the Kryanev-Lardy method for ill-posed problems; On a class of regularization methods; The parameter choice problem in linear regularization: a mathematical introduction.

AD-A088 078/1 PC A02/MF A01
South Carolina Univ Columbia Dept of Mathematics Computer Science and Statistics
Some Bayes Estimators of Reliability for the Inverse Gaussian Lifetime Model.
Interim rept.,
W. J. Padgett. Feb 80, 12p TR-53, AFOSR-TR-80-0584
Contract F49620-79-C-0140

Bayes estimation of the reliability function for the inverse Gaussian distribution is discussed. For the case that the mean lifetime is known, Bayes estimators are obtained with Jeffreys' noninformative prior and with the natural conjugate prior for the scale parameter. In the case that both parameters are unknown, an estimator of reliability is suggested which is based on the Bayes estimator obtained for the case that the mean lifetime is known. This estimator is not Bayes but compares favorably with the maximum likelihood and minimum variance unbiased estimators as indicated by computer simulations. (Author)

AD-A088 097/1 PC A02/MF A01
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
The Riccati Integral Equation Arising in Optimal Control of Delay Differential Equations.
Interim rept.,
K. Kunisch. 10 Jun 80, 16p AFOSR-TR-80-0564
Contract DAAG29-79-C-0161, Grant AFOSR-76-3092

In this paper we discuss the linear regulator problem associated with delay-differential equations. Formulas for the optimal feedback control and optimal trajectory are derived; this naturally leads to a Riccati integral equation in the state space of the delay equation. Finally, the linear regulator problem for the delay equation is approximated by sequences of regulator problems associated with ordinary differential equations in Euclidean space. (Author)

AD-A088 106/0 Not available NTIS
Princeton Univ NJ Dept of Electrical Engineering and Computer Science
Linear Recursive State Estimators under Uncertain Observations,
M. T. Hadidi, and S. C. Schwartz. 12 Jun 78, 5p
Contract N00014-77-C-0644
Supersedes report dated Jun 78, AD-A061 908.
Availability: Pub. in IEEE Transactions on Automatic Control, vAC-24 n6 p944-948 Dec 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 109/4 PC A02/MF A01
South Carolina Univ Columbia Dept of Mathematics Computer Science and Statistics
A Robust Estimator of the Difference between Location Parameters of Correlated Variables for Fragmentary Samples.
Interim rept.,
L. J. Wei. Apr 80, 16p AFOSR-TR-80-0569
Contract F49620-79-C-0140

a simple and robust estimator of the difference of location parameters of correlated variables is proposed when some observations on either of the variables are missing. We show that this estimator is consistent, asymptotically normally distributed, and insensitive to outlying observations. Asymptotic relative efficiency comparisons with other known estimators are made to show the advantage of the proposed estimator. (Author)

AD-A088 111/0 PC A02/MF A01
Florida State Univ Tallahassee Dept of Statistics
On the First Passage Time Distribution for a Class of Markov Chains.
Technical rept.,
Mark Brown, and C. N. Rao. Jul 80, 17p FSU-STATISTICS-M552, TR-79-B5, AFOSR-TR-80-0581
Contract F49620-79-C-0157, Grant AFOSR-78-3678

Consider a stochastically monotone Markov chain with monotone paths on a partially ordered countable set S. Let C be an increasing subset of S with finite complement. Then the first passage time from an element of S to C is shown to be IFRA (increasing failure rate on the average). Several applications are presented including coherent systems, shockmodels, and convolutions of IFRA distributions. (Author)

AD-A088 113/6 PC A02/MF A01
Rhode Island Univ Kingston Dept of Mathematics
A Uniqueness Theorem for Ordinary Differential Equations.
Interim rept.,
M. J. Norris, and R. D. Driver. May 80, 8p AFOSR-TR-80-0585
Contract F49620-79-C-0129
Prepared in cooperation with Sandia National Labs, Albuquerque, NM, Contract DE-AC04-76DP00789.

The uniqueness theorem of this paper answers an open question for a system of differential equations arising in a certain n-body problem of classical electrodynamics. The essence of the result can be illustrated using the scalar prototype equation x' = g sub 1 (x) + g sub 2 (t + x) with x(0) = 0. The solution of the latter will be unique provided g sub 1 and g sub 2 are continuous positive functions of bounded variation. (Author)

AD-A088 115/1 PC A02/MF A01
South Carolina Univ Columbia Dept of Mathematics Computer Science and Statistics
Asymptotically Distribution-Free Simultaneous Confidence Region of Treatment Differences in a Randomized Complete Block design.
Interim rept.,
L. J. Wei. Feb 80, 12p AFOSR-TR-80-0588
Contract F49620-79-C-0140

For a randomized complete block design with additive block effects, an asymptotically distribution-free simultaneous confidence region of pairwise treatment differences is presented. The corresponding confidence bound has an explicit form and is easily obtained. An example is provided for illustration purpose. The case of treatment against control is also discussed. (Author)

AD-A088 125/0 PC A02/MF A01
Ohio State Univ Columbus Dept of Statistics
Ranking and Selection in Designed Experiments: Complete Factorial Experiments.
Technical rept.,
Edward J. Dudewicz, and Baldeo K. Taneja. Jul 80, 25p Rept no. TR-210
Contract N00014-78-C-0543

Over the years, while it has been recognized that developments for other designs are of great interest, almost all ranking and selection papers have dealt explicitly only with the completely randomized design. We review what is known in other design settings, then proceed to new results on the complete factorial experimental design. We show that existing procedures are vitiated by interaction in such a design, but give a new procedure which is fully valid even in the presence of unbounded interaction. (Author)

AD-A088 178/9 PC A05/MF A01
Princeton Univ NJ Information Sciences and Systems Lab
The Off-Line Use of a Sequential Estimator.
Technical rept.,
Thomas G. Robertazzi, and Stuart C. Schwartz. Jul 80, 82p Rept no. TR-4
Contract N00014-80-C-0530

The straightforward application of a sequential estimator to nonlinear regression (curve fitting) problems is generally not possible when good a priori parameter estimates are not available and also when minimizing the error over a local portion of the data does not insure that it is minimized globally. However, a sequential estimator may be easily utilized to perform off-line processing in such a situation. The key is to process the measurements in a random order rather than the causal order in which they occur. The off-line use of an extended Kalman filter is illustrated in terms of a particular application. This technique is essentially a sequential version of the Gauss-Newton minimization procedure with relinearization being performed after each measurement is processed. Fictitious measurement noise is necessary to prevent filter divergence and is included in a very simple manner. Computational savings over more conventional iterative minimization techniques are possible if the functions and partial derivatives involved are sufficiently complex to evaluate. But there is a real question regarding the extent to which convergence can be assured. The results of simulations are presented. (Author)

AD-A088 181/3 PC A02/MF A01
South Carolina Univ Columbia Dept of Mathematics Computer Science and Statistics
The Analysis of a Randomized Complete Block Design when Observations are Subject to Arbitrary Right Censorship.
Interim rept.,
L. J. Wei. Nov 79, 17p AFOSR-TR-80-0568
Contract F49620-79-C-0140

Based on arbitrarily right censored observations, asymptotically distribution free tests are proposed for testing the equivalence of K treatments in the analysis of a randomized complete block design with random block effect. Multiple comparsions procedures which incorporate a pairwise ranking scheme are also proposed for determining which, if any, treatments differ from each other. (Author)

AD-A088 182/1 PC A02/MF A01
South Carolina Univ Columbia Dept of Mathematics Computer Science and Statistics
Nonparametric Empirical Bayes Estimation of Reliability.
Technical rept.,
K. Y. Liang, and W. J. Padgett. May 80, 14p TR-58, AFOSR-TR-80-0587
Contract F49620-79-C-0140

Several sequences of nonparametric empirical Bayes estimators of a distribution (or reliability) function are considered. Their asymptotic optimality relative to a Dirichlet process prior is investigated, and the estimators are compared for a small number of stages with respect to Weibull distributions by computer simulation. (Author)

AD-A088 183/9 PC A02/MF A01
Illinois Univ At Chicago Circle Dept of Mathematics

Application of the Conditional Population-Mixture Model to Image Segmentation.
Technical rept.,
Stanley L. Sclove. 15 Aug 80, 6p Rept no. UICC-MATH-TR-80-1
Contract N00014-80-C-0408

The problem of image segmentation is considered in the context of a mixture of probability distributions. A modification of the usual approach to mixtures of distributions is employed. Parametric families of distributions are considered, a set of parameter values being associated with each distribution. In addition, an identification parameter is associated with each observation, indicating from which distribution the observation arose. Thus, the segmentation problem is cast as a problem of statistical estimation. Segmentation algorithms are obtained by applying a method of iterated maximum likelihood to the resulting likelihood function. (Author)

AD-A088 194/6 PC **A02**/MF **A01**
Iowa Univ Iowa City Dept of Statistics
Likelihood Ratio Tests for and against a Stochastic Ordering between Multinomial Populations; Tests for a Stochastic Ordering.
Technical rept.,
Tim Robertson, and F. T. Wright. 17 Jul 80, 23p Rept no. TR-2
Contracts N00014-80-C-0321, N00014-80-C-0322

Likelihood ratio tests concerning the parameters of two multinomial populations are discussed. A stochastic ordering restriction is considered as a one sided alternative to equality. The one and two sample tests for equality versus stochastic ordering and stochastic ordering versus all alternatives are derived and their large sample distributions are obtained. The large sample distributions are mixtures of chi-squared distributions. The tests developed provide discrete analogues for the one sided Mann-Whitney-Wilcoxin and Kolmogorov-Smirnov tests. (Author)

AD-A088 224/1 PC **A02**/MF **A01**
Tennessee Univ Knoxville Dept of Mathematics
Semistable Laws on Topological Vector Spaces.
Interim rept.,
Dong M. Chung, Balram S. Rajput, and Albert Tortrat. Sep 79, 24p Rept no. TR-7901
Contract N00014-78-C-0468

In this paper three types of results were discussed: Firstly, two Levy-Khinchin type representations of Poisson type infinitely divisible (i.D.) laws on certain topological vector (TV) spaces-one of these complements a known representation due to Dettweiler; Secondly, the r-semistable laws on locally convex TV spaces and also obtain good representation of their characteristic functions, Finally, the existence and the continuity of the semigroup mu superscript t where t greater than 0 of i.d. laws mu on locally convex TV spaces. These complement similar known results of Siebert.

AD-A088 242/3 PC **A02**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Generic Properties of an Integro-Differential Equation.
Interim rept.,
Jack K. Hale. Jun 80, 14p AFOSR-TR-80-0575
Contract DAAG29-79-C-0161, Grant AFOSR-76-3092
Sponsored in part by Grant NSF-MCS79-05774.

Consider the functional differential equation where a,g are continuous. The linear function is such that the characteristic equation has two eigenvalues on the imaginary axis and the remaining ones with negative real parts. In spite of this, it is shown there is no generic Hopf bifurcation for any g. The nature of the bifurcation is characterized under hypotheses which appear to be generic in g. (Author)

AD-A088 243/1 PC **A02**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Analysis of Nonlinear Stochastic Systems with Wide-Band Inputs.
Interim rept.,
Harold J. Kushner, and Y. Bar-Ness. Jun 80, 21p AFOSR-TR-80-0578
Contract N00014-76-C-0279, Grant AFOSR-76-3063
Sponsored in part by Grant NSF-ENG77-12946.

A general method for approximating systems with wide-band inputs by diffusion processes is discussed. The input noise itself can be processed nonlinearly by elements of the system. One particular case is examined in detail, that of a hard limiter just after the input. The results suggest that the limiter can actually improve performance if the noise intensity is small. The development illustrates how tricky, but potentially useful, nonlinearities can be handled when the system input is wide-band noise. (Author)

AD-A088 244/9 PC **A02**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Parameter Estimation Techniques for Nonlinear Distributed Parameter Systems.
Interim rept.,
H. T. Banks, and Karl Kunisch. 27 May 80, 22p AFOSR-TR-80-0579
Contract DAAG29-79-C-0161, Grant AFOSR-76-3092
Sponsored in part by Grant NSF-MCS79-05774.

Methods for estimating system parameters are discussed for a class of partial differential equations. We develop schemes based on modal subspace approximations in some detail and include numerical examples. (Author)

AD-A088 245/6 PC **A04**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Approximation Schemes for the Linear-Quadratic Optimal Control Problem Associated with Delay-Equations.
Interim rept.,
Karl Kunisch. Mar 80, 71p AFOSR-TR-80-0577
Contract DAAG29-79-C-0161, Grant AFOSR-76-3092

The linear regulator problem for delay equation is discussed. We propose a (theoretical) solution involving Riccati integral equations and them axiomatically discuss a general approximation scheme. The details are given for spline and averaging approximations. (Author)

AD-A088 246/4 PC **A03**/MF **A01**
Maryland Univ College Park Dept of Mathematics
Some Graphical Considerations in Time Series Analysis.
Interim rept.,
Benjamin Kedem. Jun 80, 26p MD80-43-BK, TR-80-41, AFOSR-TR-80-0590
Grant AFOSR-80-0211

The pictorial information in a stationary time series as depicted by crossings of levels and crossings of random levels and related quantities is studied. It is shown that such graphical features are directly connected with the covariance function and hence with the spectral density. Many of these features can be actually applied in estimation and in the study of extremes. In the Gaussian case, the finite dimensional distributions are completely determined by the axis crossings and by the crossings of a random curve (to be defined) if the process is essentially bounded. (Author)

AD-A088 247/2 PC **A02**/MF **A01**
Maryland Univ College Park Dept of Mathematics
On Nearest Neighbor Degeneracies of Indistinguishable Particles.
Interim rept.,
Benjamin Kedem. Jun 80, 22p MD80-37-BK, TR-80-36, AFOSR-TR-80-0589
Contract F49620-79-c-0095

Arrangement degeneracies suggested by sufficient statistics associated with binary stationary m'th order Markov chains are discussed, and are shown to correspond and generalize some degeneracies arising when indistinguishable particles are placed on a one-dimensional lattice with n compartments. From these statistics it is possible to define an m-th order unit. The arrangement degeneracy obtained from s 1's and n-s O's so that lower order units are placed in higher order units is solved. However, the most general arrangement degeneracy associated with all the sufficient statistics of a given order is difficult. For this case only the 3rd order arrangement degeneracy is obtained, the 1st and 2nd orders being relatively simple. These results are applied in determining the asymptotic distributions of rare events. (Author)

AD-A088 249/8 PC **A02**/MF **A01**
South Carolina Univ Columbia Dept of Mathematics Computer Science and Statistics
Asymptotic Conservativeness and Efficiency of Kruskal-Wallis Test for K Dependent Samples.
Interim rept.,
L. J. Wei. May 80, 13p AFOSR-TR-80-0566
Contract F49620-79-C-0140

The robustness (asymptotic conservativeness) of Kruskal-Wallis test under certain departures from mutual independence of K univariate samples is established. This robustness provides a procedure for testing the equality of K marginal distribution functions on a broken random sample from a K-variate distribution which satisfies a mild condition. For the unbroken sample, a generalized Kruskal-Wallis test is proposed for testing the symmetry of a K-dimensional distribution function. The relative efficiency of the K-W test against the aligned rank order test is also examined under the normal shift model. (Author)

AD-A088 250/6 PC **A02**/MF **A01**
South Carolina Univ Columbia Dept of Mathematics Computer Science and Statistics
Nonparametric Bayes Estimation of Distribution Functions and the Study of Probability Density Estimates.
Interim rept. 1 Jun 79-31 May 80,
W. J. Padgett, R. L. Taylor, and L. J. Wei. 30 Jun 80, 18p AFOSR-TR-80-0571
Contract F49620-79-c-0140

In work under this grant, major results were obtained in the four broad areas of survival analysis and life testing, probability density estimates and laws of large numbers, estimation after testing, and robustness and distribution-free procedures. In particular, nonparametric estimators of the failure rate function and survival probability were developed under the assumption of increasing failure rate using both maximum likelihood and Bayesian approaches. These particular results have attracted wide attention due to their generality and applicability in survival analysis and reliability estimation from arbitrarily right-censored data. Also, consistency results for both univariate and multivariate kernel estimates for probability density functions and regression functions were obtained using techniques and results of function-space probability theory. Sequential procedures were developed and analyzed which provided interval estimators of the parameter of interest after testing certain hypotheses. Various robustness and nonparametric methods for incomplete samples and broken samples were also studied. Thus, maintenance policies and development of new, more reliable, equipment may be formulated using statistical procedures and theory from these results. (Author)

AD-A088 251/4 PC **A02**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Identification of Nonlinear Delay Systems Using Spline Methods.
Interim rept.,
H. T. Banks. Jun 80, 17p AFOSR-TR-80-0563
Contract DAAG29-79-C-0161, Grant AFOSR-76-3092
Sponsored in part by Grant NSF-MCS79-05774.

Spline based approximation schemes for nonlinear nonautonomous functional differential equation control systems are discussed and it is shown how these may be employed in parameter estimation techniques. A sample of our numerical findings is also presented. (Author)

AD-A088 288/6 PC **A02**/MF **A01**
SRI International Menlo Park CA
Two-Dimensional Mesh Adjustment Algorithm.
Annual rept. 1 Jun 79-31 May 80,
C. M. Ablow, and S. Schechter. 25 Jul 80, 9p AFOSR-TR-80-0626

Contract F49620-77-C-0114

During this third year of research the particular, previously presented, mesh adjustment algorithms for the finite difference solution of ordinary differential equation systems have been shown to be instances of the use of monitor functions intrinsic to the system and its solution. These monitors have been found to be nearly as accurate as the monitor that minimizes the truncation error. The weighted normalizing monitor, which uses the sum of the squares of derivatives of the solution function, has been applied in a two-dimensional mesh adjustment algorithm. (Author)

AD-A088 305/8 PC **A02**/MF **A01**
Cornell Univ Ithaca NY School of Operations Research and Industrial Engineering
A Note on the Lower Bound for the P(CS) of Gupta's Subset Selection Procedure.
Technical rept.,
Robert E. Bechhofer, and Thomas J. Santner.
Dec 79, 11p Rept no. TR-401
Contracts DAAG29-80-C-0036, N00014-75-C-0586
Sponsored in part by Grant NSF-ENG79-06914.

The lower bound on the specified P* for the Gupta procedure for selecting a subset containing the best of k populations, and for the Gupta-Sobel procedure for selecting a subset containing all populations at least as good as a control population is studied via impartial 'no data' minimax decision rules. Gibbons, Olkin, and Sobel (1977) state that a theoretical lower bound is 1/2(k) for both problems. Our analysis shows (a) that 1/k is the correct lower bound for the first problem, and (b) that 1/2(k) is the correct lower bound for the second problem provided that a particular loss function is adopted. Other (reasonable) choices of loss function lead to different lower bounds for the second problem. (Author)

AD-A088 330/6 PC **A02**/MF **A01**
South Carolina Univ Columbia Dept of Mathematics Computer Science and Statistics
On the Almost sure Convergence of Weighted Sums of Random Elements in D(0,1).
Interim rept.,
Robert Lee Taylor, and C. A. Calhoun. Jun 80, 15p TR-56, AFOSR-TR-80-0570
Contract F49620-79-C-0140

The convergence of weighted sums of random elements in D(0,1) was obtained by Taylor and Daffer (1979) using a number of conditions such as convex tightness, moment conditions, and others. In this paper both the moment conditions and the tightness conditions are substantially relaxed in obtaining the almost sure convergence of weighted sums of random elements in D(0,1). In addition, a brief discussion of the necessary integral conditions will be included which will delineate these results and previous work.

AD-A088 342/1 PC **A02**/MF **A01**
Tennessee Univ Knoxville Dept of Mathematics
Support and Seminorm Integrability Theorems for r-Semistable Probability Measures on LCTVS.
Interim rept.,
Donald Louie, and Balram S. Rajput. Jan 79, 21p Rept no. TR-7902
Contract N00014-78-C-0468

Let mu be an r-semistable k-regular probability measure of index a epsilon (0,2) on a complete locally convex topological vector space E. It is shown that the topological support S sub mu of mu is a translated convex cone if alpha epsilon (0, 1), and a translated truncated cone if alpha epsilon (1, 2). Further, if alpha = 1 and mu is symmetric, then it is shown that S sub mu is a vector subspace of E. These results subsume all earlier known results regarding the support of stable measures. Results dealing with the support of infinitely divisible and the seminorm integrability for gamma-semistable measures are also obtained. (Author)

AD-A088 343/9 PC **A02**/MF **A01**
Tennessee Univ Knoxville Dept of Mathematics
A Zero-One Dichotomy Theorem for r-Semi-Stable Laws on Infinite Dimensional Linear Spaces.
Interim rept.,
Donald Louie, Balram S. Rajput, and Albert Tortrat. Oct 78, 15p Rept no. TR-7903
Contract N00014-78-C-0468

Let mu be an r-semistable probability measure on a real linear space e. It is shown that the mu-measure of any translate of an arbitrary measurable linear subspace over certain countable subfield of reals is 0 or 1. This result yields dudley-Kantor 0-1 laws for stable laws and fernique 0-1 law for quasistable lasw. It is also shown that the r-semistable laws - like stable ones - are continuous: i.e., they assign zero mass to singletons. (Author)

AD-A088 344/7 PC **A02**/MF **A01**
Tennessee Univ Knoxville Dept of Mathematics
Un Theorem de Probabilite Zero ou un Dans Groupe Measurable or Topologique Queiconque (O-1 Theorem of Probability in a Measurable or Topological Group).
Interim rept.,
Balram S. Rajput, and Albert Tortrat. Feb 80, 10p Rept no. TR-8001
Contract N00014-74-C-0468
Text in French.

No abstract available.

AD-A088 374/4 PC **A02**/MF **A01**
Tennessee Univ Knoxville Dept of Mathematics
A Zero-one Law for a Class of Measures on Groups.
Technical rept.,
Balram Rajput, Donald Louie, and Albert Tortrat. Sep 79, 11p Rept no. TR-7905
Contract N00014-78-C-0468

Let (E beta) be a measurable (non-abelian) group, alpha a measurable homomorphism on E and mu a law on (E beta) satisfying mu = mu(alpha) v(alpha) (with mu(alpha) = mu o/alpha), for some law v(alpha) on (E beta). Under some additional conditions it is shown that, for every proper normal subgroup G of E and a in E, if Ga is an element of beta (mu), the mu-completion of B, then mu(Ga) = 0 or 1. As a corollary, it is shown that this result yields all previously known 0-1 laws for stable, semistable, and quasistable laws on linear spaces as well as new 0-1 laws for other classes of infinitely divisible laws on linear spaces.

AD-A088 464/3 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Studies on Fourier Series on Spheres,
Samuel Y. K. Yee. 1980, 5p Rept no. AFGL-TR-80-0235
Pub. in Monthly Weather Review, v108 n5 p676-678 May 80.

No abstract available.

AD-A088 482/5 PC **A02**/MF **A01**
Texas Univ At Austin Dept of Electrical Engineering
On the L1 Convergence of Kernel Estimators of Regression Functions with Applications in Discrimination,
Luc P. Devroye, and T. J. Wagner. 20 Apr 78, 13p AFOSR-TR-80-0607
Grant AFOSR-77-3385
Pub. in Zeitschrift fuer Wahrscheinlichkeitstheorie und Verwandte Gebiete, v51 p15-25 1980.

No abstract available.

AD-A088 483/3 PC **A02**/MF **A01**
Florida Univ Gainesville Center for Mathematical System Theory
Partial Model Matching of Linear Systems,
E. Emre, and L. M. Silverman. 18 Oct 79, 4p AFOSR-TR-80-0606
Grants AFOSR-76-3034, DAAG29-77-G-0225
Pub. in IEEE Transactions on Automatic Control, vAC-25 n2 p280-281 Apr 80.

No abstract available.

AD-A088 484/1 PC **A02**/MF **A01**
Rochester Univ NY Dept of Statistics
Some Remarks on Two Quick Estimators of Location,
Govind S. Mudholkar, and Kartik R. Patel. 1979, 14p AFOSR-TR-80-0604
Grant AFOSR-77-3360
Pub. in Jnl. of the Indian Statistical Association, v17 p197-209 1979.

No abstract available.

AD-A088 485/8 PC **A02**/MF **A01**
Florida Univ Gainesville Center for Mathematical System Theory
On a Natural Realization of Matrix Fraction Descriptions,
E. Emre. 29 Jun 79, 4p AFOSR-TR-80-0605
Grants AFOSR-76-3034, DAAG29-77-G-0225
Pub. in IEEE Transactions on Automatic Control, vAC25 n2 p288-289 Apr 80.

No abstract available.

AD-A088 486/6 PC **A02**/MF **A01**
Pittsburgh Univ PA Dept of Electrical Engineering
Two-Dimensional Matrix Pade Approximants: Existence, Nonuniqueness, and Recursive Computation,
N. K. Bose, and S. Basu. 30 Oct 78, 6p AFOSR-TR-80-0603
Grant AFOSR-78-3542
Pub. in IEEE Transactions on Automatic Control, vAC-25 n3 p509-514 Jun 80.

No abstract available.

AD-A088 489/0 PC **A02**/MF **A01**
Louisiana State Univ Baton Rouge Dept of Electrical Engineering
Multiple Signal Extraction by Polynomial Filtering,
W. A. Porter. 15 Dec 78, 19p AFOSR-TR-80-0601
Grant AFOSR-78-3500
Pub. in Mathematical Systems Theory, v13 p237-254 1980.

No abstract available.

AD-A088 505/3 PC **A03**/MF **A01**
Decision Science Consortium Inc Falls Church VA
On the Reconciliation of Probability Assessments,
Journal article,
Dennis V. Lindley, Amos Tversky, and Rex V. Brown. 1979, 38p
Contract N00014-79-C-0209
Pub. in The Jnl. of the Royal Statistical Society, serA, v142 pt2 p146-180 1979.

No abstract available.

AD-A950 021/6 MF **A01**
New York Univ Bronx Dept of Industrial Engineering and Operations Research
Single-Sample Attri-Vari Plans for Item-Variability in Percent Defective,
John H. K. Kao. May 65, 22p
Contract Nonr-285(62)
Availability: Microfiche copies only.

No abstract available.

BNL-27929 PC **A02**/MF **A01**
Memorial Univ. of Newfoundland, St. John's.
Asymptotic Distribution of a Histogram Density Estimator.
B. K. Kim, and J. Van Ryzin. Jun 80, 16p CONF-800658-1
Contract AC02-76CH00016
Colloquium on nonparametric statistical inference, Budapest, Hungary, 22 Jun 1980.

Two theorems on the asymptotic distribution of a histogram density estimator based on randomly determined spacings introduced by Van Ryzin in 1973 are stated and proved. One theorem gives conditions for the pointwise asymptotic normality of the density estimator for points in the support of the density at which the density is continuously differentiable. A second theorem gives conditions for the pointwise asymptotic normality of the density estimator with a faster convergence rate for points in the support of the density at which the density is twice continuously differentiable. The results are used to compare the relative asymptotic efficiencies of the histogram estimator with the kernal method of density estimation. (ERA citation 05:031427)

CNRS-CPT-79-P-1076 PC **A02**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Jordan's Algebra of a Facially Homogeneous Autopolar Cone.
J. Bellissard, and B. Iochum. Jan 79, 8p
In French.
U.S. Sales Only.

It is shown that a Jordan-Banach algebra with predual may be canonically associated with a facially homogeneous autopolar cone. This construction generalizes the case where a trace vector exists in the cone. (Atomindex citation 11:506221)

COO-2280-11 PC **A06**/MF **A01**
Northwestern Univ., Evanston, IL. Technological Inst.
Finite Sparse Matrix Techniques.
E. H. Bareiss, and C. M. de Peniza. Nov 79, 102p
Contract AS02-76ER02280

A unified theory of finite sparse matrix techniques based on a literature search and new results is presented. It is intended to aid in computational work and symbolic manipulation of large sparse systems of linear equations. The theory relies on the bijection property of bipartite graph and rectangular Boolean matrix representation. The concept of perfect elimination matrices is extended from the classification under similarity transformations to that under equivalence transformations with permutation matrices. The reducibility problem is treated with a new and simpler proof than found in the literature. A number of useful algorithms are described. The minimum deficiency algorithms are extended to the new classification, where the latter required a different technique of proof. 13 figures, 7 tables. (ERA citation 05:031429)

COO-2280-38 PC **A03**/MF **A01**
Northwestern Univ., Evanston, IL. Technological Inst.
OBV Methods.
R. Beauwens. Aug 79, 37p
Contract AS02-76ER02280

The properties of OB relaxation of Varga iterative methods are investigated, with particular emphasis on diagonal relaxation. Generalizations of the results of Beauwens and Quenon (SIAM J. Numer. Anal., 13, 615-643 (1976)) are presented, and their relations with the works of Axelsson and Gustafsson are indicated. Finally, the combination of this formalism with the Axelsson-Gustafsson analysis to enlarge the scope of the latter is illustrated. (ERA citation 05:031430)

EUR-CEA-FC-897 PC **A02**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Correspondences. Equivalence Relations.
G. M. Bouligand. Mar 78, 22p
In French.
U.S. Sales Only.

We comment on paragraph 3 'Correspondences' and paragraph 6 'Equivalence Relations' in chapter II of 'Elements de mathematique' by N. Bourbaki in order to simplify their comprehension. Paragraph 3 explains the ideas of graph, correspondence, and map or function, and their composition laws. We draw attention to the following points: 1) With the convention of writing from left to right, the composition law for two correspondences (A,F,B), (U,G,V) of graphs F, G is written in full generality (A,F,B)o(U,G,V) = (A,FoG,V). It is not therefore assumed that the co-domain B of the first correspondence is identical to the domain U of the second (EII.13 D.7), (1970). 2) The axiom of choice consists of creating the Hilbert terms from the only relations admitting a graph. 3) The statement of the existence theorem of a function h such that f = goh, where f and g are two given maps having the same domain (of definition), is completed if h is more precisely an injection. Paragraph 6 considers the generalization of equality: First, by 'the equivalence relation associated with a map f of a set E' identical to (x is a member of the set E and y is a member of the set E and xcf = y:f). Consequently, every relation R(x,y) which is equivalent to this is an equivalence relation in E (symmetrical, transitive, reflexive); then R admits a graph included in E x E, etc. Secondly, by means of the Hilbert term of a relation R subject to the equivalence. In this last case, if R(x,y) is separately collectivizing in x and y, theta(x) is not the class of objects equivalent to x for R (EII.47.9), (1970). The interest of bringing together these two subjects, apart from this logical order, resides also in the fact that the theorem mentioned in 3) can be expressed by means of the equivalence relations associated with the functions f and g. The solutions of the examples proposed reveal their simplicity. (Atomindex citation 11:503234)

HMI-B-220 PC **A15**/MF **A01**
Hahn-Meitner-Inst. fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.).
Spline-Procedures.
R. Schmidt. Dec 76, 344p
In German.
U.S. Sales Only.

This report contains a short introduction to spline functions as well as a complete description of the spline procedures presently available in the HMI-library. These include polynomial splines (using either B-splines or one-sided basis representations) and natural splines, as well as their application to interpolation, quasiinterpolation, L sub 2 -, and Tchebycheff approximation. Special procedures are included for the case of cubic splines. Complete test examples with input and output are provided for each of the procedures. (Atomindex citation 09:412266)

IC-77-126 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Differential Properties of Continuous Functions.
F. M. Diab, and A. M. Sarhan. Oct 77, 7p
U.S. Sales Only.

The main purpose of this paper is to obtain some new differential properties of real continuous functions and their analogies for complex continuous functions. (Atomindex citation 09:415155)

IC-77-132 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Angular Derivatives for a Certain Class of Analytic Univalent Functions.
F. M. Diab. Nov 77, 4p
U.S. Sales Only.

In this paper some interesting boundary properties are proven for a certain class of analytic univalent function, i.e. analytic univalent functions with univalent derivatives in the unit circle. (Atomindex citation 09:415154)

IFVE-OTF-79-64 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Representation of Zero Curvature for the System of Essentially Nonlinear Partial Differential Equations X/sub alpha /,Z Z-Bar = exp(Kx)/sub alpha / and Its Integrability.
A. N. Leznov, and M. V. Saveliev. 1979, 12p
U.S. Sales Only.

Representation of zero curvature for the system of essentially nonlinear partial differential equations x/sub alpha ,z z-bar = exp(sigma /sub beta / = 1/sup r/k//sub alpha //sub beta /x//sub beta /), 1 < = alpha < = r, with an arbitrary numerical matrix k is constructed in an explicit form. On the basis of this representation an invariant integration method for the system when k coincides with the Cartan matrix of simple Lie algebra of rank r is given. The final solutions depend on 2r arbitrary functions. (Atomindex citation 11:503318)

INIS-mf-5341 PC **A06**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Branching Processes with Continuous State Space.
P. J. M. Kallenberg. 6 Jun 79, 125p
U.S. Sales Only.

Some asymptotic properties of so-called branching processes are considered. In talking about a branching process (Z/sub n/, n = 0, 1, 2,...) it is usual to think of Z/sub n/ as the number of individuals in the n/sub th/ generation of some population. Such processes are known as Galton-Watson processes. The size of the population can also be measured by other means than by the number of individuals, for instance by means of its weight or volume. Therefore, it is reasonable to consider branching processes with the non-negative real numbers as their state space. Particular attention is paid to the correspondences and the differences between these processes and Galton-Watson processes. It is shown that a necessary and sufficient condition for the existence of such processes is that the offspring distribution, defined as the distribution of the random quantity produced by a quantity of size 1, is infinitely divisible, and that for these processes P (lim/sub n/ yields/infinity/ Z/sub n/ = 0 or infinity) = 1. The behavior of the process on the events (lim/sub n/yields/infinity/ Z/sub n/ = 0) and (lim/sub n/yields/infinity/ Z/sub n/ = infinity) is further investigated. As a rule we can say that this behavior is essentially the same as that for Galton-Watson processes. (Atomindex citation 11:495378)

KMU-QFT-79-2 PC **A03**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Existence and Density Theorems for Stochastic Maps on Commutative C*-Algebras.
P. M. Alberti, and A. Uhlmann. Jun 79, 27p
U.S. Sales Only.

Theorems are presented on the structure of stochastic and normalized positive linear maps over commutative C*-algebras. It is shown how strongly the solution of the n-tuple problem for stochastic maps relates to the fact that stochastic maps of finite rank are weakly dense within stochastic maps in case of a commutative C*-algebra. A new proof of the density theorem is given and (besides the solution of the n-tuple problem) results are derived concerning the extremal maps of certain convex subsets which are weakly dense. All stated facts suggest application in statistical physics (algebraic approach), especially concerning questions around evolution of classical systems. (Atomindex citation 11:509342)

LA-UR-80-1721 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Practical Applications of Adaptive Mesh Refinement (Rezoning).
F. M. Guerra, D. L. Humphrey, and R. E. Hoffman 1980, 42p CONF-7905164-1
Contract W-7405-ENG-36
Engineering application of the finite element method conference, Oslo, Norway, May 1979.

A collection of finite element problems that have been examined with a posteriori convergence measures is presented. Results show that these local convergence measures can be used to indicate the quality of a finite element solution and to suggest boundaries for mesh rezones. 18 figures, 1 table. (ERA citation 05:031328)

MHSMP-80-31 PC **A02**/MF **A01**
Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX.
Wang 700 Program to Calculate a One-Sided Confidence Interval for the Parameter of a Poisson Distribution.
R. W. Ashcraft. Jul 80, 12p
Contract AC04-76DP00487

The Poisson distribution and its use in risk analysis are discussed. A method is given to estimate the parameter p and derive a one-sided confidence interval for p; since the calculation is tedious, a Wang 700 program has been written. (ERA citation 05:031432)

N80-30108/8 PC **A03**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
Algebraic Specifications of Computable and Semicomputable Data Structures.
J. A. Bergstra, and J. V. Tucker. Aug 79, 27p
MC-IW-115/79
Submitted for Publication Sponsored by Netherlands Organization for Advancement of Pure Science.

Theoretical issues relating to algebraic specification methods for data structures are addressed.

Results are obtained which show that every computable data structure possesses a special kind of finite, equational hidden functions specification and that every semicomputable data structure possesses a special kind of finite, equational hidden sorts specification.

N80-30109/6 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
Derivatives of Programs.
J. W. Debakker, and J. I. Zucker. Sep 79, 18p MC-IW-116/79
Submitted for Publication Sponsored by Netherlands Organization for Advancement of Pure Science.

The notions of upper and lower derivations of a recursive (nondeterministic) program are defined and used to characterize termination for such a program in terms of the well foundedness of a function with respect to a predicate. This extends earlier work on induction rules and proofs of termination to the case of nested recursions, formulated in terms of a least fixed point construct. It is shown how this characterization can be interpreted as stating that a recursive procedure always terminates if it exhibits neithe global nor local nondetermination.

N80-30110/4 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
On the Structure of an Adaptive Multi-Level Algorithm.
P. W. Hemker. May 79, 20p MC-NW-65/79
Submitted for Publication Sponsored by Netherlands Organization for Advancement of Pure Science.

The structure of multilevel adaptive algorithms is explained. Their recursive character is exposed by means of the formal language ALGOL 68. The basic structure is given in two forms: course grid corrections to fine grids, and fine grid corrections to coarse grids. The latter description is shown more convenient for the treatment of fully automatic adaptive grids. A full approximation storage, full multigrid algorithm is described, then used in an ALGOL 68 procedure for the solution of boundary value problems with adaptive mesh refinements.

N80-30111/2 PC **A10**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
Tables of the First 15,000 Zeros of the Riemann zeta Function to 28 Significant Digits, and Related Quantities.
H. J. J. Teriele. Jun 79, 160p MC-NW-67/79

A table of the imaginary parts of the first 15,000 zeros rho sub N of the Riemann zeta function, zeta (s), in the critical strip, with an accuracy of 28 significant digits, is given. Moreover, two additional tables of the related quantities 1/the absolute value rho sub N zeta prime (rho sub N), and arg (rho sub N zeta prime (rho sub N)) are given to 10 significant digits. Calculations involve (1) a separation and a zero finding procedure, combined with Gram's law; (2) application of the Reimann-Siegel formula; (3) improvement of the accuracy with the Newton process, which entails (4) substitution of the Euler-MacLaurin formula for the Riemann-Siegel computation of zeta (s). A FORTRAN program on a CDC Cyber 73/173 computer system was used.

N80-30112/0 PC **A03**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
On the Treatment of Time Dependent Boundary Conditions in Splitting Methods for Parabolic Differential Equations.
B. P. Sommeijer, P. J. Vanderhouwen, and J. G. Verwer. Jun 79, 28p MC-NW-68/79
Submitted for Publication.

A class of splitting method for two-space dimensional parabolic partial differential equations are investigated in reference to the fact that splitting methods usually exhibit a drop in accuracy if boundary conditions become time dependent. A boundary value correction is discussed for the Laplace equation with Dirichlet conditions, then is generalized for a wide class of initial boundary value problems. A numerical comparision is made between the alternating direction implicit method and the locally one-dimensional method as applied to problems with Dirichlet boundary conditions and non-Dirichlet boundary conditions. Results show that when the time-integration error dominates, the accuracy of the locally one-dimensional method decreases. On the other hand, accuracy was satisfactory, for Dirichlet conditions, with a modified version of the alternating direction implicit method.

N80-30113/8 PC **A03**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
The Calculation of Eigenvectors and Invariant Subspaces.
M. Louter-nool. Aug 79, 46p MC-NW-69/79

The algebraic eigenvalue problem of real general matrices, especially of matrices having multiple eigenvalues, is considered. The Schur-decomposition method as a stable method for calculating eigenvalues is chosen. The vectors v sub 1, v sub 2, ..., v sub r are said to span an invariant subspace of A of order r if v sub 1, v sub 2, ..., v sub r are linearly independent and Av sub i (i = 1, 2, ..., r) lies in that same subspace. An algorithm to determine these vectors is given and elucidated. Finally, some PASCAL procedures (with numerical results) for the calculation of eigenvalues of a real, possibly defective and/or derogatory matrix as well as for the calculation of the corresponding eigenvectors and invariant subspaces are presented, along with a theorem on the perturbation of eigenvalues.

N80-30114/6 PC **A03**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
Analysis of Numerical Methods for Solving Second Kind Volterra Equations by Imbedding Techniques.
P. H. M. Wolkenfelt, P. J. Vanderhouwen, and C. T. H. Baker. Sep 79, 26p MC-NW-71/79
Submitted for Publication.

The properties of a wide class of numerical methods for second kind Volterra integral equations with an arbitrary smooth, nonlinear, kernel function are examined. For the analysis, the imbedding of the integral equation in a differential equation containing one parameter is proposed. The solution of the integral equation is then related to the solution of the differential equation and this connection suggests a technique for deriving numerical methods, many of which prove to be classical. This connection, is thoroughly explored.

N80-30115/3 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
On the Internal Stability of Explicit M-Stage Runge-Kutta Methods for Large M-Values.
P. J. Vanderhouwen, and B. P. Sommeijer. Sep 79, 18p MC-NW-72/79
Submitted for Publication.

Explicit, m-stage Runge-Kutta methods are derived for which the maximal stable integration step per right hand side evaluation is proportional to m when applied to semidiscrete parabolic initial boundary value problems. The internal stability behavior of these methods is compared with that of similar Runge-Kutta methods proposed in the literature. Both by analysis and by numerical experiments it is shown that the value of m in the schemes proposed is not restricted by internal instabilities.

N80-30116/1 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Mathematical Statistics.
A Note on Some Methods for Regression Analysis with Incomplete Observations.
R. D. Gill. Jan 79, 16p MC-SW-65/79
Submitted for Publication.

Some related proposals for estimating regresssion coefficients with incomplete experimental observations are discussed. The proposals include 'approximate standard errors' for the estimators. It is shown that the estimators of the regression coefficients are consistent under fairly weak conditions, but that only under rather strong ones can be usual (asymptotic) tests of significance be validly based on the estimated coefficients and the computated standard deviations. The covariate-sequence of assuming a random or fixed specification for the covariates are also discussed.

N80-30117/9 PC **A04**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Applied Mathematics.
The Numerical Computation of Special Functions by Use of Quadrature Rules for Saddle Point Integrals: Gamma Functions, Modified Bessel Functions, and Parabolic Cylinder Functions.
N. M. Temme. Nov 78, 58p MC-TW-183/78

Quadrature rules were used for the computation of special functions. The functions considered were the Euler gamma function, modified Bessel functions, and parabolic cylinder functions. The starting point was an integral, the quadrature method used for evaluating the integral being the trapezoidal rule. The range of the parameters was chosen such that in the saddle point integrals used, the procedure was not disturbed for some combinations of the variables of the function. It is shown that in the saddle point analysis of the Bessel Functions and the parabolic cylinder functions more than one saddle point of integrand can be considered. The computer programs used are given as ALGOL 60 procedures for the integral representations.

N80-30119/5 PC **A03**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Applied Mathematics.
A Fractional Integral Operator Corresponding to Negative Powers of a Second Order Partial Differential Operator.
I. G. Sprinkhuizen-kuyper. Jun 79, 47p MC-TW-191/79
Submitted for Publication.

A fractional integral operator is derived for which the partial differential operator plays a role similar to that of ordinary differentiation (d/dx) with respect to the fractional integral of Riemann-Liouville. An application is given to the Koornwinder polynomials (a class of orthogonal polynomials in two variables). Also, an operator is obtained which has the Jacobi functions of order 1/2 (NU-1), -1/2 as its eigenfunctions.

N80-30120/3 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Pure Mathematics.
On the Nonexistence of a (57, 14, 1) Strongly Regular Graph.
H. A. Wilbrink, and A. E. Brouwer. Dec 78, 8p MC-ZW-121/78

It is shown that a strongly regular graph with parameters n = 57, k = 14, lambda = 1, mu = 4 (10,1) - eigenvalues: 1*14, 38*2, 18*(-5); (1,-1)-eigenvalues: 1*28, 38*(-5), 18*9y does not exist. To this effect, an inductive proof is established.

N80-30121/1 PC **A02**/MF **A01**
Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
Approximation of Harmonic Functions.
B. E. J. Dahlberg. 1979, 13p CTH-MATH-1979-10

Let u be harmonic in a bounded Lipschitz domain D with a regular boundary. The problem of when it is possible to find functions f sub j whose gradients are measures of bounded variation in D, such that D sup (the absolute value of (f-f sub j)) tends to infinity as j tends to infinity, is studied. Results prove that this approximation is always possible if u is the Poisson integral of a function f, belonging to L sup p (sigma), p or = 2, where sigma denotes the surface measure of partial differentiation in D. An example is also given which shows that this result does not extend to p 2.

N80-30122/9 PC **A04**/MF **A01**
Loughborough Univ. of Technology (England). Dept. of Mathematics.
On the Spectra and Stability of Periodic Differantial Equations.
B. J. Harris. Feb 78, 54p MATH-RES-124

A Floquet theory is derived for the periodic Dirac equations of relativistic quantum mechanics within

a crystal. This theory is used to obtain a relationship between the spectra of certain linear operations on a Hilbert space and the stability regions associated with the Dirac equations.

N80-30123/7 PC **A02**/MF **A01**
Loughborough Univ. of Technology (England). Dept. of Mathematics.
On an Inequality of Wirtinger.
B. J. Harris. Feb 78, 10p MATH-RES-125

Wirtinger's inequality is stated as a complex valued function F defined and absolutely continuous on the closed interval 0, 2 pi such that F prime belongs to L squared 0, 2 pi while, firstly, F(0) = F(2 pi), and secondly, the integral from zero to 2 pi of F(X) dx = zero. Thus the integral from zero to 2 pi of (the absolute value squared (F prime (X))) dx or = the integral from zero to 2 pi of (the absolute value squared (F(X))) dx. Proofs involving operator theory are considered. An elementary, operator theory proof of a slightly more general inequality is then developed.

N80-30124/5 PC **A03**/MF **A01**
Loughborough Univ. of Technology (England). Dept. of Mathematics.
Some Performance Trials and Modifications to a Rational Line Search and a Chebyshev Line Search.
G. A. Evans. Mar 79, 33p MATH-RES-138

Given a line search, the problem of how to obtain the accurate local minimum with a minimum of objective function evaluations is studied. The Powell quadratic line search is introduced as a reference. Two other line search algorithms, the rational function approach and the Chebyshev-based numerical differentiator, are considered in comparison. Data on efficiency was obtained by replacing the quadratic line search, for which results are known, by each of the other methods. A set of well known test functions was used. Performance test results show that the algorithms using a rational fit are comparable with the quadratic fit of Powell. The Chebyshev method in its current form falls short of the other two algorithms in efficiency.

N80-30125/2 PC **A03**/MF **A01**
Trent Polytechnic, Nottingham (England). Dept. of Mathematical Sciences.
On an Alternative Form of System Matrix for Delay-Differential Systems.
M. G. Frost, and C. Storey. Apr 79, 32p MATH-RES-139

A form of system matrix over the set of real numbers, corresponding to a delay-differential system, is considered. The possiblity of decomposing a system matrix of this form, using an associated form of a transformation of similarity is also taken into account. To what extent the controllability and observability of such systems depends on the decoupling factors of the system matrix is examined. Finally, various types of controllability for systems corresponding to system matrices of this form are discussed in connection with previously established concepts of (real numbers) sup n controllability and function space null controllability.

N80-30126/0 PC **A02**/MF **A01**
Trent Polytechnic, Nottingham (England). Dept. of Mathematical Sciences.
Another Form of System Matrix Associated with Delay-Differential Systems.
M. G. Frost, and C. Storey. Aug 79, 20p MATH-RES-142

Various kinds of controllability as well as necessary and sufficient conditions for these types of controllability are defined for a form of system matrix over the set of real numbers, corresponding to a delay differential system. Various types of observability are also defined. To what extent controllability and observability depend on the decoupling factors and zeros of a system matrix of this form is discussed. Of particular interest are system matrices which have delay only in the state as well as system matrices which have delay only in the control term in the input state relationship. Finally, conditions under which associated forms of transformations of similarity exist between those types of system matrices are determined.

N80-30137/7 PC **A03**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research.
Stochastic Systems and the Problem of State Space Realization.
J. C. Willems, and J. H. Vanschuppen. Jun 79, 35p MC-BW-108/79
Submitted for Publication. Presented at NATO Advanced Study Inst. And Ams Summer Sem. in Applied Math. On Algebraic and Geometric Methods in Linear System Theory, Cambridge, Mass., 18-29 Jun. 1979.

An exposition of an approach to the problem of stochastic realization theory is presented. The concept of splitting relations and splitting random variables is introduced. How one can construct all minimal splitters for Gaussian random vectors is shown in detail. The relevant definitions of (autonomous) stochastic dynamic systems, of stochastic realization theory, and of white noise representation, as they arise naturally in this context are then introduced. The case of Gaussian random processes is worked out in detail. An example, a zero mean stationary Gaussian process defined on a probability space, is examined, concentrating on state space realizations of the form y(t)=f(x(t)) with x a Markov process. Results show that there is no unique (up to linear equivalence) minimal realization of stochastic finite dimensional stationary Gaussian processes.

N80-30147/6 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research.
Factorization Indices at Infinity for Rational Matrix Functions.
P. A. Fuhrmann, and J. C. Willems. Sep 79, 17p MC-BW-113/79
Submitted for Publication.

The Wiener Hopf factorizations at infinity of a transfer function are studied. Then, the corresponding factorization indices are related to the reachability indices of a feedback equivalent, feedback irreducible system. Results are used to point out some interesting relations between the factorization indices of operator theory. By using purely algebraic methods the analysis is carried over an arbitrary field. Given a strictly proper rational matrix function G, a minimal realization Sigma=(A,B,C,) of G is constructed. The reachability indices of (A,B) with the left factorization of G are identified. The factorization indices of G itself are associated with the reachability indices of an associated feedback irreducible system feedback equivalent to G.

N80-30148/4 PC **A03**/MF **A01**
Loughborough Univ. of Technology (England). Dept. of Mathematics.
A Newman-Penrose Type Formalism for Space-Times with Torsion.
S. Jogia, and J. B. Griffiths. Jun 79, 30p MATH-RES-140
Sponsored in Part by United Kingdom Scientific Research Council.

The Newman-Penrose formalism, in which the curvature of space-time is represented in terms of spin coefficients, is extended to include the possibility of an asymmetric connection. No particular equations of motion are assumed. In accordance with the spin coefficient approach these are included only in applications. The full set of equations extending over the Ricci identities, the contortion identities, and the Bianchi identities are given. The formalism presented is therefore applicable to all theories which consider the Riemann-Cartan space-time U sub 4, such as certain problems in Einstein-Cartan theory and other theories of gravitation that include torsion.

ORNL/CSD/TM-120 PC **E03**/MF **A01**
Oak Ridge National Lab., TN.
Revised User's Manual for the Hierarchical Cluster Analysis Code DENDRO.
N. M. Larson, and C. L. Begovich. 76p
Contract W-7405-ENG-26

The computer code DENDRO is a multipurpose hierarchical cluster analysis program containing many data-normalization choices, metric options, and clustering criteria. This report is intended to be an update of the user's manual for DENDRO, including equations describing each normalization, metric, and clustering option, results of application of DENDRO to various types of data sets, operating instructions, and sample input-output. 6 figures, 5 tables. (ERA citation 05:031445)

ORNL/CSD/TM-125 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Critical Evaluation of Readily Available Software for Spectral Analysis of Discrete Time Series Data.
B. W. Rust. Jul 80, 40p
Contract W-7405-ENG-26

This report is designed to be a beginner's guide to the use of current readily available software for the Fourier analysis of real-time series. It uses an example test problem to explain the basic concepts and to describe the use of some of the most readily accessible subroutines and includes evaluations of those subroutines. (ERA citation 05:031433)

PB80-218431 Not available NTIS
National Bureau of Standards, Washington, DC.
Square Roots with Positive Definite Hermitian Part.
Final rept.,
C. R. Johnson, and M. Neumann. Jan 80, 3p
Pub. in Linear and Multilinear Algebra 8, p353-355 Jan 80.

The question of when a square matrix has a square root whose hermitian part is positive definite is posed and discussed.

PB80-815988 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Integration of Partial Differential Equations. 1970-September, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Sep 80,
George W. Reimherr. Oct 80, 225p
Supersedes NTIS/PS-79/1066, and NTIS/PS-78/0981.

The bibliography cites research reports on the numerical integration of partial differential equation (PDE). Some other numerical techniques are presented, including variational methods, finite difference theory, and asymptotic solutions. Research on computer computations of PDE is included. (This updated bibliography contains 217 citations, 17 of which are new entries to the previous edition.)

PB80-852015 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Autocorrelation. January, 1979-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 79-May 80,
Howard L. Ogushwitz. Jun 80, 176p
NERACIAANT1018
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations discuss the mathematical technique of autocorrelation, and the applications of this technique to diverse fields such as air traffic control, boundary layer turbulance, optical processing, and data processing. (Contains 200 citations.)

PB80-852023 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Autocorrelation. January, 1976-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 76-Jun 80,
Howard L. Ogushwitz. Jun 80, 224p
NERACUSGNT1018
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations discuss the mathematical technique of autocorrelation, and the applications of this technique to diverse fields such as air traffic control, boundary layer turbulance, optical processing, and data processing. (Contains 200 citations.)

PB80-852049 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.

Autocorrelation. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 190p NERACEI NT1018
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations discuss the mathematical technique of autocorrelation, and the applications of this technique to diverse fields such as air traffic control, boundary layer turbulance, optical processing, and data processing. (Contains 200 citations.)

PB80-852064 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Crosscorrelation. December, 1973-June, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 73-Jun 80,
Howard L. Ogushwitz. Jun 80, 232p NERACUSGNT1017
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover the use of the mathematical technique of cross correlation for diverse applications. (Contains 200 citations.)

PB80-853203 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Z-Transforms. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 46p NERACEI NT0337
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the theory and applications of Z-transforms to such areas as electronics, data systems, algebraic computations, and ground motion studies. (Contains 47 citations.)

PB80-854573 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Topology. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jun 80, 113p
NERACIAANT0606
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the mathematical topological transformations applied to various technical fields. (Contains 082 citations.)

PB80-854581 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Topology. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 192p
NERACUSGNT0606
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the mathematical topological transformations applied to various technical fields. (Contains 157 citations.)

PB80-854599 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Topology. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 191p
NERACEDBNT0606
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the mathematical topological transformations applied to various technical fields. (Contains 176 citations.)

PB80-854607 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Topology. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 190p NERACEI NT0606
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the mathematical topological transformations applied to various technical fields. (Contains 171 citations.)

PB80-855620 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Matrix Algebra. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 118p
NERACIAANT0913
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the theory and applications of matrix algebra. Computer algorithms, unique solutions, and other applied techniques are also presented. (Contains 128 citations.)

PB80-855638 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Matrix Algebra. June, 1974-May, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 188p
NERACUSGNT0913
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the theory and applications of matrix algebra. Computer algorithms, unique solutions, and other applied techniques are also presented. (Contains 200 citations.)

PB80-855646 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Matrix Algebra. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 89p
NERACEDBNT0913
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the theory and applications of matrix algebra. Computer algorithms, unique solutions, and other applied techniques are also presented. (Contains 080 citations.)

PB80-855653 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Matrix Algebra. January, 1977-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 77-Jun 80,
Howard L. Ogushwitz. Jun 80, 193p NERACEI NT0913
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the theory and applications of matrix algebra. Computer algorithms, unique solutions, and other applied techniques are also presented. (Contains 200 citations.)

PB80-856099 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Discriminate Analysis Techniques. June, 1970-, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-une 80,
William V. Sassi. Jun 80, 151p
NERACUSGNT0970
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and applications of discriminate analysis techniques and methods in such areas as testing, estimation, and prediction as applied to business, natural disasters, and personnel performance. (Contains 138 citations.)

PB80-860182 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Monte Carlo Techniques. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 141p
NERACIAANT1253
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations discuss various applications of the Monte Carlo Method. Computer applications are also considered. (Contains 127 citations.)

PB80-860190 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Monte Carlo Techniques. April, 1979-June, 1980 (Citations from the NTIS Data Base).
Rept. for Apr 79-Jun 80,
Howard L. Ogushwitz. Jun 80, 229p
NERACUSGNT1253
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations discuss various applications of the Monte Carlo Method. Computer applications are also considered. (Contains 200 citations.)

PB80-860208 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Monte Carlo Techniques. May, 1978-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for May 78-Jun 80,
Howard L. Ogushwitz. Jun 80, 216p NERACEI NT1253
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations discuss various applications of the Monte Carlo Method. Computer applications are also considered. (Contains 200 citations.)

PB80-860216 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Monte Carlo Techniques. December, 1977-May, 1980 (Citations from the Energy Data Base).
Rept. for Dec 77-May 80,
Howard L. Ogushwitz. Jun 80, 213p
NERACEDBNT1253
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations discuss various applications of the Monte Carlo Method. Computer applications are also considered. (Contains 200 citations.)

PCTR-53-78 PC **A03**/MF **A01**
Purdue Univ., Lafayette, IN. School of Electrical Engineering.
Monograph on the Use of the Multivariate Gram Charlier Series Type A.
T. Hatayodom, and G. Heydt. Jan 78, 50p TR-EE-78-5
Contract AS02-77ET29102

The Gram-Charlier series in an infinite series expansion for a probability density function (pdf) in which terms of the series are Hermite polynomials. There are several Gram-Charlier series - the best known is Type A. The Gram-Charlier series, Type A (GCA) exists for both univariate and multivariate random variables. This monograph introduces the multivariate GCA and illustrates its use through several examples. A brief bibliography and discussion of Hermite polynomials is also included. 9 figures, 2 tables. (ERA citation 05:031434)

SAND-79-2476 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Survey of Numerical Methods for Ordinary Differential Equations.
H. A. Watts. May 80, 40p CONF-800347-2
Contract AC04-DP00789
SIAM international conference on electric power problems: the mathematical challenge, Seattle, WA, USA, 18 Mar 1980.

Significant progress has been made in recent years in the numerical solution of initial-value prob-

lems for ordinary differential equations. Algorithmic and software advances have been substantial, leading to code improvements in the areas of overall efficiency, reliability, robustness (the ability to diagnose and handle unexpected difficulties or misuse of the codes), and convenience (ease of use). Good codes are now readily available, and difficult nonstiff as well as many stiff problems are currently being solved rather routinely. Stiff problems remain relatively expensive to solve, and current stiff solvers are somewhat less reliable than nonstiff counterparts; however, it is expected that the next generation of ODE software will substantially improve on some of these drawbacks. This survey paper briefly outlines some of the best methods being used, identifies some software, and mentions some of the current research directions. Particular emphasis is given to methods and codes aimed at solving stiff problems. 95 references. (ERA citation 05:031435)

UIUCDCS-R-80-1006 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Computer Science.
Method and Initial Stepsize Selection in Multistep ODE Solvers.
C. W. Gear. Feb 80, 38p
Contract AS02-76ER02383

This report examines a technique for determining three groups of information needed to start an automatic ODE solver: the initial stepsize, estimates of the largest eigenvalue, and high-accuracy estimates of the solution at several nearby points. The stepsize estimate allows an efficient start for multistep or one-step methods; the eigenvalue allows the code to decide which class of methods to use (although it is recommended that the initial steps should always be taken with a nonstiff method); the additional function values allow a high-order multistep method be used from the start. (ERA citation 05:031441)

UIUCDCS-R-80-1014 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Computer Science.
Unified Modified Divided Difference Implementation of Adams and BDF Fomulas.
C. W. Gear. Mar 80, 27p
Contract AS02-76ER02383

The representation of both full variable-step and fixed-leading-coefficient implementations of BDF formulas using the modified divided differences normally associated with Adams' formulas is developed. Simple recursion relationships for the coefficients are derived. The technique permits a simple, compact implementation of variable-step and fixed-leading-coefficient forms of blended formulas. (ERA citation 05:031442)

12B. Operations Research

AD-A087 951/0 PC **A03**/MF **A01**
Air Command and Staff Coll Maxwell AFB AL
Physics of Sports - The Forward Pass.
Research rept.,
Michael T. Toole. May 80, 35p Rept no. ACSC-2500-80A

THe use of the physics of sports has become increasingly popular in recent years in teaching physics. This article uses Lagrange's Equation for a non-conservative holonomic system to develop a mathematical model for the forward pass. The model is used to analyze the motion of the football during flight. (Author)

AD-A088 032/8 PC **A04**/MF **A01**
Stanford Univ CA Dept of Operations Research
Near-Equivalence of Network Flow Algorithms.
Technical rept.,
Norman Zadeh. 1 Dec 79, 54p Rept no. TR-36
Contract N00014-75-C-0493, Grant NSF-ENG76-12266

Network problems arising in practice typically have non-negative arc costs. On such problems we show that the following algorithms perform, modulo ties, the same sequence of flow augmentations. (1) Simplex (with the standard pivot rule and Big-M start), (2) Out-of-Kilter (Primal-Dual), (3) Dual Simplex (with the standard pivot rule), (4) Lemke's Complementary Pivot Algorithm. All methods compute a shortest path tree by mimicking the Dijkstra algorithm and then send flow along a sequence of minimum cost paths. Differences in implementation are discussed. It becomes clear that Dantzig's simplex method with the best empirical pivot rule (not the standard rule) will outperform other methods (variations of Simplex with the standard rule). A simple reason is given why Dual Simplex (best empirical) cannot do as well as Simplex (best empirical).

AD-A088 079/9 PC **A03**/MF **A01**
Krannert Graduate School of Management Lafayette IN
A Generalized Decision Support System Using Predicate Calculus and Network Data Base Management.
Technical rept.,
Robert H. Bonczek, Clyde W. Holsapple, and Andrew B. Whinston. Jul 80, 36p ARO-16231.5-EL
Contract DAAG29-79-C-0154

In view of the growing prominence of corporate modeling, an important area of research concerns techniques for facilitating the design and utilization of models. In this paper we show how first-order predicate calculus can be used as a language for formally stating modeling knowledge. Furthermore, knowledge stated in this manner can be subjected to the resolution principle. The result is that application specific modeling knowledge need not be embedded in a computer program. Rather, it can be stored in a data base and utilized as needed by a problem processing system employing resolution techniques. Advantages of a decision support system taking an approach of this sort are considerable modeling flexibility, capacity for automating the model formulation and execution processes, and compatibility with a high-level user interface language. (Author)

AD-A088 199/5 PC **A02**/MF **A01**
California Univ Berkeley Operations Research Center
A Duality Theorem in Production Correspondences.
Research rept.,
King-Tim Mak. Jun 80, 21p Rept no. ORC-80-15
Contract N00014-76-C-0134, Grant NSF-MCS77-16054

A generalized cost function is introduced in this report. Using this notion of cost, a theorem on the duality between the cost and distance functions of production correspondences is derived without the usual assumptions of strong-disposability of inputs nor the convexity of input sets. (Author)

AD-A088 296/9 PC **A05**/MF **A01**
North Carolina State Univ Raleigh Operations Research
On Estimating the Probability Distribution Functions in PERT-Type Networks-Revision.
Technical rept.,
Bajis Dodin. Jun 80, 77p NCSU-OR-153-REV, ARO-16352.3-M
Contract DAAG29-79-C-0211, Grant NSF-ENG78-13936

This study deals with the problem of approximating the probability distribution function of the project duration in probabilistic activity networks. It describes a procedure that has been developed, programmed and tested, using activity networks of real life projects as well as randomly generated ones. The procedure allows the activity duration to have any of the following distributions: Uniform, Triangular, Normal, Exponential, Gamma, Beta or any discrete distribution presented in a finite set of ordered pairs. The computational experience indicates that the resultant probability distribution function (pdf) is very close to the actual pdf, the latter is obtained through extensive Monte Carlo sampling. In fact, computational experience shows that the pdf obtained by Monte Carlo sampling converges to the approximate pdf as the sample size increases. The procedures is programmed in FORTRAN and the CPU time for any moderate size project (i.e., G(N,A) < or = G(60,200)) is less than half a minute on AMDAHL V-7. (Author)

AD-A088 306/6 PC **A02**/MF **A01**
Cornell Univ Ithaca NY School of Operations Research and Industrial Engineering
Incomplete Block Designs for Comparing Treatments with a Control (IV): Optimal Designs for p = 4, k = 4.
Technical rept.,
Robert E. Bechhofer, and Ajit C. Tamhane. Jan 80, 24p Rept no. TR-440
Contracts DAAG29-80-C-0036, N00014-75-C-0586
Prepared in cooperation with Northwestern Univ., Evanston, IL, Grant NSF-ENG77-06112.

The present paper continues the study of balanced treatment incomplete block (BTIB) designs initiated previously. This class of designs was proposed for the problem of comparing simultaneously p > or = 2 test treatments with a control treatment when the observations are taken in blocks of common size k < p + 1. A list of generator designs, the conjectured minimal complete class of generator designs, a catalog of admissible designs, and tables of optimal designs are given for p = 4, k = 4. Some comparisons are made with admissible designs for p = 4, k = 3.

AD-A088 307/4 PC **A02**/MF **A01**
Cornell Univ Ithaca NY School of Operations Research and Industrial Engineering
Incomplete Block Designs for Comparing Treatments with a Control (V): Optimal Designs for p = 6, k = 3.
Technical rept.,
Robert E. Bechhofer, and Ajit C. Tamhane. Jun 80, 25p Rept no. TR-441
Contracts DAAG29-80-C-0036, N00014-75-C-0586
Prepared in cooperation with Northwestern Univ., Evanston, IL, Grant NSF-ENG77-06112.

The present paper continues the study of balanced treatment incomplete block (BTIB) designs initiated previously. This class of designs was proposed for the problem of comparing simultaneously p > or = 2 test treatments with a control treatment when the observations are taken in blocks of common size k < p+1. The conjectured minimal complete class of generator designs, a catalog of admissible designs, and tables of optimal designs are given for p = 6, k = 3. The efficiency of the optimal BTIB design relative to that of replications of a BIB design is computed for situations in which both provide the same probability guarantee for the multiple comparisons with a control problem.

AD-A088 308/2 PC **A02**/MF **A01**
Cornell Univ Ithaca NY School of Operations Research and Industrial Engineering
Incomplete Block Designs for Comparing Treatments with a Control (VI): Conjectured Minimal Complete Class of Generator Designs for p = 5, k = 4 and p = 6, k = 4.
Technical rept.,
Robert E. Bechhofer, Ajit C. Tamhane, and Stephen W. Mykytyn. Apr 80, 23p Rept no. TR-453
Contracts DAAG29-80-C-0036, N00014-75-C-0586
Prepared in cooperation with Northwestern Univ., Evanston, IL, Grant NSF-ENG77-06112.

The present paper continues the study of balanced treatment incomplete block (BTIB) designs initiated previously. This class of designs was proposed for the problem of comparing simultaneously p > 2 test treatments with a control treatment when the observations are taken in blocks of common size k < p+1. In previous reports we gave lists of generator designs, the conjectured minimal complete class of generator designs, a catalog of admissible designs, and tables of optimal designs for p = 2(1)6, k = 2; p = 3(1)6, k = 3; and p = 4, k = 4. This present paper gives our conjectured minimal complete class of generator designs for p = 5, k = 4 and p = 6, k = 4 based on a generalized notion of C-inadmissibility. At this time we have made no further computations based on these classes of designs. Interested researchers are encouraged to supplement these classes if they are not already minimal complete.

AD-A088 523/6 PC **A05**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Industrial Engineering and Operations Research

The M/G/1 Queue with Delayed Feedback.
Doctoral thesis,
Robert Doyle Foley. 1979, 78p Rept no. VTR 8010
Contract N00014-77-C-0743

The M/G/1 queue with delayed feedback is a two node queueing network. External arrivals to node one from a Poisson process. Node one has a general server with an unlimited queue capacity and a first come, first serve queue discipline. After completing service a customer either departs from the network or feeds back to node two. Node two delays customers before allowing them to reenter node one. The delay is modelled as a ./M/1 queue. After completing service at node two, a customer reenters node one. Thus the total input process to node one consists of exogenous arrivals and endogenous reentries from node two. The probability of a customer feeding back is allowed to depend on the queue length at nodes one and two and on the service time of the customer at node one. (Author)

N80-30107/0 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research.
Complexity of Location Problems on Networks.
A. Kolen. May 79, 20p MC-BW-107/79

The theory of computational complexity is briefly discussed, showing the existence of a class of NP-complete problems which are equivalent in the sense that none is known to be solvable in polynomial time. There is also a class of NP-hard problems for which it is conjectured that no polynomial time algorithm exists. Some well-known location problems, namely, the p-center problem (with mutual communication), the simple (capacited) plant location problem, and the maximal covering problem are then considered. It is shown that all these problems are NP-hard.

N80-30138/5 PC **A03**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research.
Approximations for the Steady State Probabilities in the Multiserver M/G/C Queue.
H. C. Tijms, M. H. Vanhoorn, and A. Federgruen. Jul 79, 28p MC-BW-109/79
Submitted for Publication.

For the multiserver queue with Poisson arrivals and general service times, various approximations for the steady state probabilities of the queue size are presented. These approximations are computed from numerically stable recursion schemes which can be easily applied in practice. Numerical experience reveals that the approximations are very accurate with errors typically below 5%. For the delay probability the various approximations result either in the widely used Erlang delay probability or in an approximation which improves in many cases the Erlang delay probability approximation.

N80-30143/5 PC **A06**/MF **A01**
Technische Hogeschool, Eindhoven (Netherlands). Dept. of Electrical Engineering.
The Gauss-Markov Approximation Scheme for Identification of Multivariable Dynamic Systems Through Realization Theory: An Explicit Approach.
A. K. Hajdasinski. Aug 79, 108p TH-78-E-88, ISBN-90-6144-088-2
Sponsored in Part by Stichting Voo Zuiver Wetenschappelijk Onderzoek (Zwo).

How dynamic, linear, time invariant systems can be described in terms of the Hankel representation (H model). The H model and Markov parameters description of a system is then considered. Results of digital simulations are examined showing minimal variances in the Markov parameters as compared to a least squares estimation and an estimation using a sample covariance matrix. The use of the Ho-Kalman algorithm, based on a pseduo-inversion and singular valve decomposition method, to filter noisy Markov parameters is also explained.

N80-30144/3 PC **A03**/MF **A01**
Technische Hogeschool, Eindhoven (Netherlands). Dept. of Electrical Engineering.
The Global Error Approach to the Convergence of Closed Loop Identification, Self Tuning Regulators, and of Self Tuning Predictors.
A. Niederlinski. Sep 78, 37p TH-78-E-89, ISBN-90-6144-089-0

The global error is the identification error expressed as a function of unknown system parameters, model parameters, and external system inputs. It provides a convenient tool to test mean-square convergence for a number of complicated estimation problems. It is shown, how the global error approach can be used to give a simple explanation of well-known closed loop system models is shown. A self tuning regulation is analyzed for the general case of a difference equation model. A stationary time series to be predicted N-steps ahead is described and a unique solution for the predictor parameters is found which correspond to the optimum prediction parameters.

N80-30145/0 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research.
Characterizing Properties of the Value Function for Stochastic Games.
S. H. Tijs, and O. J. Vrieze. Jul 79, 19p MC-BW-110/79
Submitted for Publication.

The axiomatic characterization of the value function of two-person zero-sum games in normal form is extended to dynamic games. Special attention is given to the value function of discounted two-person zero-sum stochastic games. Furthermore, value functions for stochastic games with arbitrary evaluation rules and general state as well as action spaces are examined. The characterizing axioms are indicated by the terms objectivity, monotony, and sufficiency (or symmetry) for both players. The concept of a superfluous action is used for a player in a state of the game. Such an action can be ignored by a player without his being punished, since the value of the game remains invariant. It is also shown that the characterizing axioms are mutually independent.

PB80-216625 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
New Algorithms for Assignment and Transportation Problems,
Dimitri P. Bertsekas. Sep 79, 46p LIDS-R-945, NSF/RA-790509
Grant NSF-ENG79-06332

A new method for solving the classical assignment problem is proposed. In some ways the algorithm resembles the Hungarian method. The worst case computational complexity of one implementation of the algorithm for full dense, all integer, NxN problems is the same as the Hungarian method. However, the average complexity of the algorithm seems to be considerably better than the Hungarian method. In a large number of randomly generated problems the algorithm has consistently outperformed an efficiently coded version of the Hungarian method by a broad margin. On heuristic grounds, it appears that the new method owes its good performance principally to a phenomenon referred to as 'outpricing', a property of the method whereby during the course of the algorithm the prices of some sinks are increased by large increments, much larger than in the Hungarian method. As a consequence, these sinks are temporarily or permanently outpriced by other sinks and are, in effect, driven out of the problem in the sense that they do no get labeled and scanned further for relatively long time periods. As a result, the algorithm requires fewer row operations since it deals with a problem of lower dimension.

SAND-80-1140C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Centrality of Paths and Vertices in a Graph: Cores and Pits.
P. J. Slater. 1980, 11p CONF-800558-1
Contract AC04-76DP00789
International conference on the theory and applications of graphs, Kalamazoo, MI, USA, 6 May 1980.

As criteria for the selection of a site at which to locate a facility in a graph or network, measures of the suitability of a vertex v include the eccentricity e(v), the distance d(v), and, when the graph is a tree, the branch weight bw(v). A vertex at which function e, d, or bw is minimized is called a center, a median, or a (branch weight) centroid, respectively. For a tree T the functions e, d, and bw are convex functions on vertex set V(T); and, in general, they measure how central a vertex is relative to the other vertices. The nature of the facility to be constructed (such as a pipeline) could necessitate selecting a structure (such as a path) rather than just a point at which to locate the facility. Similarly, the facility may be required to service structures or areas within the graph. Functions e, d, and bw can be applied to paths P in the graph and (minimum) paths P for which e(P), d(P), and bw(P) are minimized are called path centers, cores, and spines, respectively. With emphasis on these central paths, central structures are examined. 3 figures. (ERA citation 05:031438)

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

BNL-27546 PC **A02**/MF **A01**
National Center for Analysis of Energy Systems, Upton, NY.
Planning Analyses for Geothermal District Heating.
R. G. Tessmer, Jr., and J. Karkheck. Dec 79, 15p CONF-791204-36
Contract AC02-76CH00016
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10 Dec 1979.

Methodology and data bases are described which can provide a comprehensive planning assessment of the potential for geothermal district heating in any US market. This economic systems model encompasses life-cycle costing over a period of rising competitive fuel prices, it addresses the expansion and financing of a district system over time, and it includes an overall optimization of system design. The elemental area for all analyses is the census tract, for which published data allow estimation of residential and commercial heating demands, building retrofit requirements, and competitive fuel consumption and cost. A system type design, an appropriate hot water district piping system, and costing of heat supply is performed for groups of contiguous tracts in any urban market. Groups are aggregated, in decreasing benefit to cost order, to achieve optimal systems. A specific application for Salt Lake City, Utah, is also described. (ERA citation 05:028893)

CONF-780249- PC **A17**/MF **A01**
Atlas Corp., Santa Cruz, CA.
Use of Solar Energy for the Cooling of Buildings.
E. F. Clark, and F. de Winter. Oct 78, 393p
Contract EG-77-C-02-4576
Workshop on the use of solar energy for the cooling of buildings, San Francisco, CA, USA, 15 Feb 1978.

Separate abstracts were prepared for the 46 papers included. (ERA citation 05:030473)

CONF-800828-1 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Performance of the Boise Cascade-INEL Manufactured Solar Home.
A. S. Lau, K. H. Liebelt, M. P. Scofield, and N. R. Shinn. 1980, 5p
Contract AC07-78ID01570
Solwest, Vancouver, British Columbia, Canada, 6 Aug 1980.

Two manufactured active solar homes using air collectors and rock storage were designed, built and are being tested. The cooperative, DOE-funded project involves. Boise Cascade Corporation and the Idaho National Engineering Laboratory (INEL). The two primary goals of the project are to develop an active solar heating system that is cost-effective now, and to provide significant market penetration through the involvement of Boise Cascade, a major manufacturer of factory built houses. A brief discussion of the houses and solar systems is included, with more detailed discussion of the desktop-computer based data acquisition system and initial performance results. The 1979 cooling season data indicated a need for modifications to achieve adequate cooling system performance. Data from the heating season showed good agreement with calculations, especially the house heat loss coefficient. However, solar heating fractions were lower than predicted and an examination of the collector operating efficiency showed the collector losses to be approximately three times higher than predicted. Tests are underway to better understand the large collection losses. Comparison of the performance data and f-chart predictions shows significant differences, with predicted solar fractions being lower than actual. The solar domestic hot water preheating system performed reasonably well, with significant thermal losses noticed from the auxiliary hot water heater. Recommendations are made for the design of solar air-heating systems. (ERA citation 05:030514)

CONF-800920-15 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Progress in Direct Heat Applications Projects.
F. W. Childs, K. W. Jones, L. B. Nelson, J. A. Strawn, and M. K. Tucker. 1980. 9p
Contract AC07-76ID01570
Geothermal Resource Council annual meeting, Salt Lake City, UT, USA, 9 Sep 1980.

The development of hydrothermal energy for direct heat applications is being aided by twenty-two demonstration projects that are funded on a cost-sharing basis by the US Department of Energy, Division of Geothermal Energy. These projects are designed to demonstrate the technical and economic feasibility of the direct use of geothermal heat in the United States. Twelve of these projects are administered by the DOE-Idaho Operations Office with technical support from EG and G Idaho, Inc. Engineering and economic data for these projects are summarized in this paper. The data and experience being generated by these projects will be an important basis for future geothermal direct use projects. (ERA citation 05:030579)

DOE/CS/23337-1 PC **A09**/MF **A01**
Purdue Univ., Lafayette, IN.
Study of the Test Method for Prediction of Air Conditioning Equipment Seasonal Performance.
S. B. Thomas. May 80, 185p
Contract AC02-80CS23337
Thesis.

The test procedure, Method of Testing, Rating and Estimating the Seasonal Performance of Central Air-Conditioners and Heat Pumps Operating in the Cooling Mode, has been analyzed. The analysis of the test procedure incorporated two main functions: (1) to determine the validity of the test procedure; and (2) to determine if there are other alternate methods of obtaining the same results with less testing burden. Data were collected from industry and analyzed for any significant trends. Certain conclusions are drawn about the energy efficiency ratios, degradation coefficients and seasonal energy efficiency ratios. An error analysis was performed on the test procedure to determine the approximate amount of error when using this procedure. A semi-empirical model assuming a first order system response was developed to determine the factors that affect the part-load and cooling-load factors. The corresponding transient characteristics are then determined in terms of a single time constant. A thermostat demand cycle is used to determine the relationship between on-time and cycle-time. Recommendations are made regarding an alternate method being used to determine the seasonal energy efficiency ratio. (ERA citation 05:030796)

DOE/NASA/CR-161443 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Solar Heating and Hot Water System Installed at Municipal Building Complex, Abbeville, SC. Final Report.
Nov 79, 55p
Contract EM-78-F-01-5202

Information is provided on the solar energy system installed at the new Municipal Building for the City of Abbeville, SC. The information consists of description of solar energy system and building, photographs, system performance, operation manual, as-built drawings, lessons learned and recommendations. The solar space heating system is a direct air heating system. The flat roof collector panel was sized to provide 75% of the heating requirement based on an average day in January. The collectors used are job-built with two layers of filon corrugated fiberglass FRP panels cross lapped make up the cover. The storage consists of a pit filled with washed 3/4" - 1 1/2" diameter crushed granite stone. The air handler includes the air handling mechanism, motorized dampers, air circulating blower, sensors, control relays and mode control unit. Solar heating of water is provided only during those times when the hot air in the collector is exhausted to the outside. (ERA citation 05:030515)

DOE/NASA/CR-161471 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation. Seasonal Report for Contemporary-Manchester, Manchester, New Hampshire.
Jun 80, 80p
Contracts AC01-77CS34049, AI01-76CS31037

The solar energy system was designed to provide space heating and domestic hot water (DHW) preheating for a three-story dwelling located on the New Hampshire Vocational Technical College campus, Manchester, New Hampshire. The systems consist of twenty double glazed flat plate roof mounted warm air collectors (area 805 square feet) mounted with a tilt angle of 60 degrees from the horizontal, a 720 cubic foot horizontal rock bin for thermal storage, a central air handler, an 80 gallon DHW preheat tank, pumps, controls, plumbing and associated air ducting. Hot water pre-heating is accomplished by an air-to-water heat exchanger with auxiliary energy provided by conventional electric 80 gallon hot water tank. Auxiliary space heating is provided by a 112,000 Btu per hour, 1200 cubic feet per minute oil fired furnace. The analysis is based on instrumented system data monitored and collected for at least one full season of operation. (ERA citation 05:030516)

DOE/NASA/CR-161481 PC **A04**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation Seasonal Report for Elcam San Diego, San Diego, California.
May 80, 72p
Contracts AC01-77CS34049, AI01-76CS3103

The solar energy system, Elcam San Diego, was designed to supply domestic hot water heating for a single family residence located in Encinitas, California. The contents of this document have been divided into System Description, Performance Assessment, Operating Energy, Energy Savings, Maintenance and Summary and Conclusions. The system is a Sunspot two tank cascade type, where solar energy is supplied to either a 66 gallon preheat tank (solar storage) or a 40 gallon domestic hot water tank. Water is pumped directly from one of the two tanks, through the 65 square feet collector array and back into the same tank. Freeze protection is provided by automatically circulating hot water from the hot water tank through the collectors and exposed plumbing when freezing conditions exist. Auxiliary energy is supplied by natural gas. The Elcam San Diego solar energy system has three modes of operation. (ERA citation 05:030526)

EPRI-EM-1348(V.2) PC **A13**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Assessment of the Potential for Heat Recovery and Load Leveling on Refrigeration Systems. Volume 2. Detailed Findings. Final Report.
R. L. Merriam, W. D. Lee, J. E. Carr, S. E. Boyce, and H. S. Bierenbaum. Mar 80, 299p

The potential energy savings from refrigerant heat recovery in the residential, commercial, and industrial sectors and its impact on electric utilities were assessed. It was concluded that the technology for heat recovery is well established in all sectors and in comparison with solar water heating equivalent energy savings can be achieved at a fraction of the cost. The critical barriers to implementation in the residential sector are primarily institutional in nature. In the absence of barriers, the potential market for heat recovery could be substantial, with an annual energy savings of 0.25 x 10 exp 15 Btu by 1990. The economic impacts on summer peaking electric utilities were found to be favorable in all regions in central air conditioner applications. Annual net cost savings to the utility were estimated to be $10 to $50 per residential application. In the commercial sector and food processing segment of the industry sector, refrigerant heat recovery could reduce total energy consumption by about 0.28 x 10 exp 15 Btu, with the major savings from applications in existing buildings. The major barriers to acceptance are lack of familiarity with the technology and uncertainty relating to future codes and standards. The potential impacts on summer peaking utilities were found to be favorable. Recommendations for removing the critical barriers in all three sectors are presented, including demonstrations of heat recovery technology. (ERA citation 05:030797)

EUR-6740-EN PC **A10**/MF **A01**
Commission of the European Communities, Luxembourg.
Energy: Diesel Heat Pump for District Heating Plants and for the Heating of Large Housing Blocks.
B. Petersen. 1980, 219p
U.S. Sales Only.

The technical, economic, and environmental aspects of large diesel-driven heat pump plants for district heating or very large building heating was investigated. Possible heat sources, e.g., air, ground, and surface and waste waters, geothermal and solar sources were studied and the operation of existing district heating plants was analyzed. The possibility of using other prime movers such as gas turbines, coal-fired steam turbines and electric motors was examined for cost and efficienty. It was found that technically it is possible to construct diesel driven heat pumps in the 5 to 20 MW size range, yielding energy savings of typical 50%. At present energy prices such plants are profitable. The investigation of possible heat sources for such large heat pump gave the result that several water sources, such as sewage water, ground water, sea water, river water, and lake water could be used without problems. The use of low temperature geothermal heat looks favorable, but has to be investigated further. The diesel engine is the most economic and effient prime mover for the heat pump, but prime movers like gas engines, coal fired steam turbines and electric motor can be used, which gives a flexibility with respect to the primary energy supplies. Gas engines and electrically driven heat pumps were found to be the best solutions for small towns up to 2500 inhabitants, diesel and dual fuel engine driven heat pumps for towns with 2500 to 20,000 inhabitants, and combined heat and power production on the basis of coal (and nuclear) for large towns. (ERA citation 05:030819)

EUR-6741-EN PC **A04**/MF **A01**
Loughborough Univ. of Technology (England).
Selective Optical Coatings on Plastic Sheet for Inexpensive Radiation Insulation of Visible Windows. Final Report.
R. P. Howson. 1980, 66p

Transparent conducting oxide films have been produced by reactive ion plating onto glass and plastic substrates at room temperature. The electrical properties of these films were sufficient, with high values of electrical mobility and carrier density, to give a sharp plasma reflectance edge in the near infra-red. These properties are ideally suited for the production of visibly transmitting, infra-red reflecting surfaces needed for heat mirror applications. Optimum properties were achieved with careful control of the gas mixture and amount of substrate bias acquired by the substrate from the radio frequency used for the discharge. Satisfactory films could be made starting from evaporation or planar magnetron sputtering sources. The oxides giving satisfactory properties include those of indium, indium doped with tin, indium doped with fluorine and cadmium/tin. The latter system is of particular interest because of the availability and low cost of the starting material. Heat mirrors have been made from very thin film sandwiches of silver and gold in various dielectric using evaporation and sputtering. The known system of TiO sub 2 - Ag - TiO sub 2 gave the best performance when the TiO sub 2 was evaporated and the silver sputtered. A system of great potential interest that was introduced and constructed was that of Si - Ag - Si which gave an adequate performance. It has been demonstrated that ion plating of established optical material can give much greater mechanical abrasion resistance to a plastic surface. Tests of the thermal performance of Im exp 2 windows with simulated heat mirror systems has demonstrated that an improvement in the performance of a double glazed unit can be obtained so that it is close to that of a cavity brick wall. (U = 1.2 Wm exp -20 C exp -1). (ERA citation 05:028742)

FEI-679 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
To the Problem of Calculation of Once-Through Steam-Generating Channels.
B. V. Kokorev, and V. M. Loshchinin. 1976, 19p
In Russian.
U.S. Sales Only.

A procedure for thermal and hydraulic calculation of single-pass steam-generating channel is presented, the block-diagrams and descriptions of the programs of design and check-up calculations are given. The calculation results are compared with the experimental profiles of the temperature along the length of a single-tube, sodium-heated steam-generator model. The calculations carried out show that the proposed procedure for direct and check-up calculations of steam-generating channels and the calculation programs are workable and yield satisfactory results. (Atomindex citation 09:408330)

N80-29846/6 PC **A06**/MF **A01**
Travis-Braun and Associates, Inc., Dallas, TX.
Solar Heating and Hot Water System Installed at Office Building, One Solar Place, Dallas, Texas.
Final Report.
Jun 80, 123p NASA-CR-161483
Contract EG-77-A-01-4093

A solar heating on cooling system is described which is designed to provide 87 percent of the space heating needs, 100 percent of the potable hot water needs and is sized for future absorption cooling. The collection subsystem consists of 28 solargenics, series 76, flat plate collectors with a total area of 1,596 square feet. The solar loop circulates an ethylene glyco water solution through the collectors into a hot water system exchanger. The water storage subsystem consists of a heat exchanger, two 2,300 gallon concrete hot water storage tanks with built in heat exchangers and a back-up electric boiler. The domestic hot water subsystem sends hot water to the 10,200 square feet floor area office building hot water water fixtures. The building cold water system provides make up to the solar loop, the heating loop, and the hot water concrete storage tanks. The design, construction, cost analysis, operation and maintenance of the solar system are described.

N80-29847/4 PC **A06**/MF **A01**
Dallas Independent School District, TX.
Solar Heating and Domestic Hot Water System Installed at North Dallas High School.
Final Report.
May 80, 106p NASA-CR-161482
Contract EM-78-F-01-5204

The solar energy system located at the North Dallas High School, Dallas, Texas is discussed. The system is designed as a retrofit in a three story with basement, concrete frame high school building. Extracts from the site files, specification references for solar modification to existing building heating and domestic hot water systems, drawings, installation, operation and maintenance instructions are included.

N80-29848/2 PC **A14**/MF **A01**
Citizens Mutual Savings and Loan Association, Leavenworth, KS.
Solar Heating and Cooling System Installed at Leavenworth, Kansas.
Final Report.
Jun 80, 318p NASA-CR-161484
Contract EM-78-F-01-5193

A solar heating and cooling is described which is designed to furnish 90 percent of the overall heating load, 70 percent of the cooling load and 100 percent of the domestic hot water load. The building has two floors with a total of 12,000 square feet gross area. The system has 120 flat-plate liquid solar panels with a net area of 2,200 square feet. Five 3 ton Arkla solar assisted absorption units provide the cooling, in conjunction with a 3,000 gallon chilled water storage tank. Two 3,000 gallon storage tanks are provided with one designated for summer use, whereas both tanks are utilized during winter.

N80-29849/0 PC **A14**/MF **A01**
Stephens Coll., Columbia, MO. Building and Grounds Dept.
Solar Space Heating for the Visitors Center, Stephens College, Columbia, Missouri.
Final Report.
Jun 80, 310p NASA-CR-161485
Contract EG-77-A-01-4084

The solar energy system located at the Visitors' Center on the Stephens College Campus, Columbia, Missouri is discussed. The system is installed in a four-story, 15,000 square foot building. The solar energy system is an integral design of the building and utilizes 176 hydronic flat plate collectors which use a 50 percent water ethylene blycol solution and water-to-water heat exchanger. Solar heated water is stored in a 5,000 gallon water storage tank located in the basement equipment room. A natural gas fired hot water boiler supplies hot water when the solar energy heat supply fails to meet the demand. The designed solar contribution is 71 percent of the heating load.

N80-29850/8 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation. Seasonal Report for Colt Pueblo, Pueblo, Colorado.
Contractor Report, Feb. 1979 - Jan. 1980.
Jun 80, 93p NASA-CR-161493
Contract NAS8-32036
Sponsored in Part by DOE.

The Colt-Pueblo solar energy system, designed to provide space heating and hot water preheating, is described and its operational performance for a 12 month period from February 1979 through January 1980 is evaluated. The space heating subsystem met 31 percent of the measured space heating load which was close to the expected 34 percent solar fraction. Although the hot water solar fraction was 79 percent, the overall energy saving capability was reduced because of the low hot water demand. The measured heating subsystem performance would have improved considerably if the uncontrolled losses primarily from transport piping could have been reduced to an inconsequencital level. Fossil energy savings of 70.31 million BTUs are estimated.

N80-29851/6 PC **A04**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation. Seasonal Report for Seeco Lincoln, Lincoln, Nebraska.
Contractor Report, Apr. 1979 - Mar. 1980.
Jun 80, 71p NASA-CR-161495
Contract NAS8-32036
Sponsored in Part by DOE.

The Solar Engineering and Equipment Company (SEECO) Lincoln solar energy system, designed for space heating only, is described and its operational performance for a 12 month period from April 1979 through March 1980 is evaluated. The system met 27 percent of the space heating load; however, system losses into the heated space from the storage bin and ductwork were significant. Reducing these losses would add appreciably to the system's efficiency. Net fossil energy savings were 11.31 million BTUs.

N80-29853/2 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation: Seasonal Report for Contemporary Newman, Newman, Georgia.
Contractor Report, Jun. 1979 - Apr. 1980.
Jun 80, 80p NASA-CR-161494
Contract NAS8-32036
Sponsored in Part by DOE.

A hot solar heating and hot water system's operational performance from June 1979 through April 1980 is evaluated. Solar energy satisfied 42 percent of the total measure load (hot water plus space heating), which was somewhat higher than the solar fraction of 32 percent. When system losses into the heating space from duct leaks and storage are included, the heating solar fraction increases from 42 to 64 percent. Net electrical energy savings were 5.47 million BTUs.

N80-29855/7 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation: Seasonal Report for Fern Lansing, Lansing, Michigan.
Contractor Report, Apr. 1979 - Mar. 1980.
Jun 80, 87p NASA-CR-161491
Contract NAS8-32036
Sponsored in Part by DOE.

A solar space heating and hot water system's operational performance from April 1979 through March 1980 is evaluated. Solar energy satisfied 15 percent of the total measured load (hot water plus space heating). Net savings were approximately 21 million BTUs.

N80-29856/5 PC **A04**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation: Seasonal Report for IBM System 1B, Carlsbad, New Mexico.
Contractor Report, Apr. 1979 - Mar. 1980.
Jul 80, 75p NASA-CR-161508
Contract NAS8-32036
Sponsored in Part by DOE.

A hot solar heating and hot water system's operational performance from April 1979 through March 1980 is evaluated. The space heating and hot water loads were near expected values for the year. Solar energy provided 43 percent of the space heating and 53 percent of the hot water energy. The system did not meet the total system solar fraction design value of 69 percent because of a combination of higher estimated space heating load than was actually encountered and the apportioning of solar energy between the space heating and the domestic hot water loads. System losses and high building temperatures also contributed to this deviation. Total net savings were 23.072 million BTUs. Most of the energy savings came during the winter months, but hot water savings were sufficient to justify running the system during the summer months.

N80-30228/4 PC **A04**/MF **A01**
Ford Motor Co., Dearborn, MI.
Regenerator Matrix Physical Property Data.
C. A. Fucinari. May 80, 51p NASA-CR-159854, DOE/NASA/0008-80/11
Contracts DEN3-8, EC-77-A-31-1044

Among several cellular ceramic structures manufactured by various suppliers for regenerator application in a gas turbine engine, three have the best potential for achieving durability and performance objectives for use in gas turbines, Stirling engines,

and waste heat recovery systems: (1) an aluminum-silicate sinusoidal flow passage made from a corrugated wate paper process; (2) an extruded isosceles triangle flow passage; and (3) a second generation matrix incorporating a square flow passage formed by an embossing process. Key physical and thermal property data for these configurations presented include: heat transfer and pressure drop characteristics, compressive strength, tensile strength and elasticity, thermal expansion characteristics, chanical attack, and thermal stability.

PAT-APPL-6-165 817 PC **A03**/MF **A01**
Department of the Navy Washington DC
Control System for Solar-Assisted Heat Pump System.
Patent Application,
Richard E. Kirts. Filed 3 Jul 80, 26p AD-D007 417/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A control system for a solar-assisted heating and cooling system including a solar collector system, a thermal storage system, a water-to-air heat pump, a water-to-air heat exchanger, a domestic water heater, and a cooling tower. The preferred embodiment of the controller of the present invention includes a first temperature sensing means for sensing the temperature of the collector fluid at the outlet of the solar collector system, a second temperature sensing means for sensing the temperature of the storage fluid at the thermal storage system, and a third temperature sensing means for sensing the temperature of the inlet water to the domestic water heater. The controller energizes or deenergizes a collector fluid circulation pump and activates valve means to circulate the collector fluid between the collector system and the thermal storage system or the domestic water heater based on the temperature of the three sensors to provide efficient operation of the solar energy collection process. The controller compares the temperature of the thermal storage fluid with three control temperatures which define four temperature ranges. The controller, based on the temperature range in which the temperature of the thermal storage fluid falls, whether the system is in the heating or cooling mode, and whether there is a demand for heating or cooling automatically controls the thermal storage system, the heat pump, the heat exchanger, the cooling tower, and the connections there-between to provide increased efficiency. (Author)

PATENT-4 210 847 Not available NTIS
Department of the Navy Washington DC
Electric Wind Generator.
Patent,
Roger L. Shannon, Dale F. Watkins, and John T. Pogson. Filed 28 Dec 78, patented 1 Jul 80, 4p AD-D007 431/0, PAT-APPL-974 154
Supersedes PAT-APPL-974 154-78, AD-D006 015.
Availability: This Government-owned invention available for U.S. licensing, and, possibly for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A device for generating an air jet without the use of moving parts is provided. High voltage is used to create a corona discharge electric wind in a ducted, compact, portable generator that can be used for augmentation cooling applications where high voltage is available. (Author)

PB80-148380 PC$150.00
California Univ., Berkeley. Lawrence Berkeley Lab.
DOE-2 BDL Summary, User's Guide (Volume 1); DOE-2 Sample Run Book (Volume 2); DOE-2 Reference Manual, Part 1 (Volume 3) ; DOE-2 Reference Manual, Part 2 (Volume 4).
May 80, 2117p LBL-8688-REV-1, LBL-8689-REV-1
Contracts W-7405-eng-8, W-7405-eng-48
Supersedes PB-292 251. Document in binders and boxed. For same package without binders, see PB80-209307. For system on magnetic tape, see PB80-148398. Prepared in cooperation with Los Alamos Scientific Lab., NM.

DOE-2 is capable of rapid and detailed analysis of energy consumption in buildings. A new user-oriented input language, the building design language (BDL), has been written to allow simplified manipulation of the many variables used to describe a building and its operation. The program manual provides the user with information necessary to understand in detail the DOE-2 program. It contains a summary of the equations and algorithms used to perform the calculations, as well as flow charts to describe how each program operates. The relationship of the DOE-2 algorithms to ASHRAE algorithms is also given and traced to ASHRAE documentation. The operation, structure, and logical sequence of calculations is described in a step-by-step manner for each of the major computational programs. The manual describes the following subprograms: (1) A BDL processor (2) A loads analysis subprogram (3) A heating, ventilating, and air-conditioning (HVAC) systems analysis subprogram (4) A plant equipment subprogram (5) An economic analysis subprogram (6) Two report subprogram (7) A set of weather analysis subprogram...Software Description: The program is written in the BDL programming language for implementation on a CDC 6000 or 7000 series computer, using the scope operating system. 50k bytes of core storage are required to operate the system.

PB80-148398 Mag Tape $485.00
Department of Energy, Washington, DC. Div. of Buildings and Community Systems.
DOE-2 Building Energy Use Analysis Program.
Software,
Richard B. Curtis. Aug 80, mag tape
Supersedes PB-292 250.
Source tape is in BCD or EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Documentation available as PB80-148380, PC$150.00 (with binders), or PB80-209307, PC$130.00 (without binders).

DOE-2 is a public-domain computer program for energy use analysis of residential and commercial buildings. DOE-2 calculates the hour-by-hour energy use of a building and its life-cycle cost of operation given information on the building's location, construction, operation, and heating, ventilating and air conditioning equipment. DOE-2 can be used for (1) the design of energy-efficient new buildings; (2) analysis of existing buildings for energy-conserving modifications; and (3) calculation of design energy budgets. It is intended for architects and engineers with a basic knowledge of the thermal performance of buildings. DOE-2.1 is the computer program which has been selected as part of the SET (Standard Evaluation Technique) of the new proposed Federal BEPS (Building Energy Performance Standards).

PB80-225964 PC **A08**/MF **A01**
Clarkson Coll. of Technology, Potsdam, NY.
Potential of Industrial Scale Wood Combustion in St. Lawrence County.
Rept. for Dec 78-Oct 79,
Feng-Bor Lin, Norbert L. Ackermann, and Edward B. Kear, Jr. Oct 79, 168p NYSERDA-79-4

An assessment of the potential of wood energy utilization in St. Lawrence County, New York, and a feasibility study of converting Clarkson College's oil- and gas-fired heating plant into a wood fired plant is made. The impacts of woodburning, including: environmental effects and the effect of increased demand on forest supplies were analyzed.

PB80-850696 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Induction Furnaces. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
T. David Kennedy. Jun 80, 55p
NERACEDBNT0276
Sponsored in part by National Technical Information Service, Springfield, VA.

This report covers technical articles dealing with the melting of metals by electromagnetic induction. Broad topics include furnace operation, installations, design engineering, stirring, steelmaking, melting kinetics, etc. Coreless, channel and vacuum type furnaces using various electrical frequencies are covered as are furnace linings, refractories and crucibles. Numerous articles cover metallurgical aspects of iron and steel melting but nonferrous metals are also covered. (Contains 050 citations.)

PB80-850704 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Induction Furnaces. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 216p NERACEI NT0276
Sponsored in part by National Technical Information Service, Springfield, VA.

This report covers technical articles dealing with the melting of metals by electromagnetic induction. Broad topics include furnace operation, installations, design engineering, stirring, steelmaking, melting kinetics, etc. Coreless, channel and vacuum type furnaces using various electrical frequencies are covered as are furnace linings, refractories and crucibles. Numerous articles cover metallurgical aspects of iron and steel melting but nonferrous metals are also covered. (Contains 150 citations.)

PB80-850712 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Induction Heating. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
T. David Kennedy. Jun 80, 105p
NERACIAANT0277
Sponsored in part by National Technical Information Service, Springfield, VA.

Induction heating articles are cited mainly in the high frequency area, but a few on radio frequency are included. Topics covered include industrial heating applications and metallurgical implications. Additional articles cover less common uses of induction heating such as experiments in the physical sciences. (Contains 150 citations.)

PB80-850720 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Induction Heating. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 81p
NERACUSGNT0277
Sponsored in part by National Technical Information Service, Springfield, VA.

Induction heating articles are cited mainly in the high frequency area, but a few on radio frequency are included. Major coverage is of industrial heating and heat treating applications, from billets to cylinders, flat plates, etc. Coverage on fundamentals is included but most articles apply to specific situations. Much can be learned from the topics covered about the diversity of heating applications which induction heating can solve. Many articles cover various aspects of metallurgy as influenced by the heating method. (Contains 060 citations.)

PB80-850738 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Induction Heating. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 175p NERACEI NT0277
Sponsored in part by National Technical Information Service, Springfield, VA.

Induction heating articles are cited mainly in the high frequency area, but a few on radio frequency are included. Major coverage is of industrial heating and heat treating applications, from billets to cylinders, flat plates, etc. Coverage on fundamentals is included but most articles apply to specific situations. Much can be learned from the topics covered about the diversity of heating applications which induction heating can solve. Energy conservation is also covered. (Contains 150 citations.)

PB80-851777 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Kilns for Ceramics. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 57p NERACEI NT0563
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on kilns used in the firing of ceramics and clays. The design, instrumentation, construction, safety, air pollution control and energy consumption are also discussed. (Contains 055 citations.)

PB80-852775 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vapor Lamps. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 72p NERACEI NT0868
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design and construction of the various types of vapor lamps using low and high pressure sodium, mercury, metal halide, metal iodide, and ammonia. An analysis of the cost and application of these lamps is also included. (Contains 072 citations.)

PB80-855216 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vacuum Furnaces. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jul 80, 104p NERACIAANT0728
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the applications of vacuum furnaces in metal purifications, thin film metal deposits, crystal growth, melting high temperature alloys, metal bonding, heat treatment of metals, brazing of metals and sintering of alloys. Equipment and devices used with the vacuum furnaces are also discussed. (Contains 102 citations.)

PB80-855224 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vacuum Furnaces. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 60p NERACUSGNT0728
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the applications of vacuum furnaces in metal purifications, thin film metal deposits, crystal growth, melting high temperature alloys, metal bonding, heat treatment of metals, brazing of metals and sintering of alloys. Equipment and devices used with the vacuum furnaces are also discussed. (Contains 048 citations.)

PB80-855232 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vacuum Furnaces. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jul 80, 55p NERACEDBNT0728
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the applications of vacuum furnaces in metal purifications, thin film metal deposits, crystal growth, melting high temperature alloys, metal bonding, heat treatment of metals, brazing of metals and sintering of alloys. Equipment and devices used with the vacuum furnaces are also discussed. (Contains 047 citations.)

PB80-856065 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Stoves. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 99p NERACEI NT0948
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design and manufacturing of wood, coal, gas, and oil burning stoves for domestic and industrial use. Also included is a discussion of energy conservation through optimal stove design. (Contains 100 citations.)

PB80-856073 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Stoves. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 74p
NERACUSGNT0948
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design and manufacturing of wood, coal, gas, and oil burning stoves for domestic and industrial use. Also included is a discussion of energy conservation through optimal stove design. (Contains 052 citations.)

PB80-856081 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Stoves. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 142p
NERACEDBNT0948
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design and manufacturing of wood, coal, gas, and oil burning stoves for domestic and industrial use. Also included is a discussion of energy conservation through optimal stove design. (Contains 137 citations.)

PB80-858152 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computerized Energy Management Systems. June, 1970-June, 1980 (Citations from the Energy Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 18p
NERACEDBNT0340
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the application of computerized management of energy systems, and building energy monitors. Also included is an analysis of the future of such technology. (Contains 011 citations.)

PB80-859234 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Industrial Heating Technology. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 196p NERACEI NT0344
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design, development, and application of industrial heating technology. Also included is an analysis of solar, oil, gas, electrical. and microwave heating systems. (Contains 200 citations.)

RAND/N-1479-DOE PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Anomalous Snowfall Caused by Natural-Draft Cooling Towers.
L. R. Koenig. May 80, 49p
Contract AC03-76EV01191

Scattered reports of significant amounts of snow anomalously produced by cooling-tower plumes suggest that this process may be of importance. This conclusion is supported by study of high-resolution satellite images. Tabulation of a number of aerial observations of plumes at subfreezing temperatures indicates that a plume is likely to produce measurable snow if its temperature is colder than -13 exp 0 C and the saturation deficit of the ambient air is less than 0.5 g m exp -3 . These factors are important because they affect the rates of nucleation and growth of ice particles. The rate of mixing between plume and ambient air is also important because it affects the rate of evaporation within the plume, which in turn determines the length of time available for snow particles to grow large enough to fall out. These empirically derived criteria were tested using a numerical model of cloud microphysics that simulates the most important processes of transfer of water substance between vapor, liquid, and ice, including nucleation and development of particle-size spectra. Dynamic processes were specified, not modeled. Among the many quantities computed is the flux density of snow at the base of the plume. From this, together with average fallspeed and horizontal wind speed, one can compute the amount and pattern of snowfall at the ground. (ERA citation 05:028925)

13B. Civil Engineering

AD-A087 950/2 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Ramapo Lke Dam (NJ00216), Passaic River Basin, Tributary to Ramapo River, Bergen County, New Jersey. Phase 1 Inspection Report.
John Talerico. Mar 80, 91p
Contract DACW61-79-C-0011
Prepared in cooperation with Harris (Frederic R.) Inc., Woodbridge, NJ.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A088 020/3 PC **A08**/MF **A01**
Abcor Inc Wilmington MA Walden Div
Federal and State Water Quality Standards/ Guidelines for Selected Parameters.
Technical rept. Sep 77-Feb 79,
David R. Cogley, Linda Fereshetian, Wesley Foy, Theresa Kotlar, and James Miller. Feb 79, 167p
Contract DAMD17-77-C-7050

State and Federal guidelines and standards have been compiled for 113 military-relevant water quality parameters for the states of Arkansas, Colorado, Maryland, Missouri, Pennsylvania and Wisconsin. (Author)

AD-A088 040/1 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Skillman Dam (NJ00018), Raritan River Basin, Rock Brook, Somerset County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott. Feb 80, 93p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineering, Florham Park, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A088 041/9 PC A04/MF A01
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Whitehead Dam (NJ00559), Delaware River Basin, Assunpink Creek, Mercer County, New Jersey. Phase I Inspection Report.
Final rept.,
Rudolph Wrubel. Mar 80, 61p
Contract DACW61-79-C-0011
Prepared in cooperation with Berger (Louis) and Associates, Inc., East Orange, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A088 042/7 PC A05/MF A01
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program, Verona Lake Dam (NJ00386), Passaic River Basin, Peckman River, Essex County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott. Feb 80, 84p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineering, Florham Park, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A088 062/5 PC A08/MF A01
Environmental Protection Agency Leonardo NJ Ohmsett Test Facility
Performance Tests of High Speed ZRV Oil Skimmer.
Final rept. 8 Sep-13 Oct 79,
Michael K. Breslin. Jun 80, 156p USCG-D-42-80
Contract DOT-CG-842702-A

A self-propelled catamaran oil skimmer developed by the USCG capable of recovering oil from a water's surface was tested at the U.S. EPA OHMSETT facility. The skimmer employed an endless composite sorbent belt processed between the catamaran hulls to recover oil. The tests were designed to determine the effect that various parameters (skimmer speed, oil viscosity, oil thickness, wave conditions, etc.) have upon oil recovery performance. The skimmer was towed through oil slicks at various speeds in different wave conditions as it was operated to collect oil. The collected fluid was quantitatively analyzed to determine the device's oil-to-water recovery ratio (recovery efficiency), oil recovery rate and thoroughness of slick removal (throughput efficiency). The device proved capable of good throughput efficiency in all wave conditions (up to 0.7 m confused seas) at all the tow speeds tested (1 to 6 knots). Throughput efficiencies of 80 to 90% in calm water were common with all the oils tested. The performance of the full-scale skimmer agreed well with the results from the smaller prototype tested in 1976. The successful development of this skimmer provides a significant advance in oil spill recovery capability and technology. The concept used in this oil skimmer can be employed at speeds greater than those tested. Two oil slick converging systems were tested with the skimmer to effectively double the sweep width of the skimmer. Additional tests were conducted to determine vessel resistance and motion in waves and to assess the buildup of potentially explosive vapors within the oil recovery system. (Author)

AD-A088 171/4 PC A03/MF A01
Science Applications Inc Raleigh NC
Survey of Marine Wetland and Estuarine Water Quality and Ecological Problems in Corps of Engineers Field Offices.
Final rept. Nov 78-Jan 79,
Peter Hamilton. Jun 80, 30p WES-MP-EL-80-2
Contract DACW39-78-C-0087

This report presents the results of a survey of Corps of Engineers (CE) field offices that have coastal zone responsibilities. The purpose of the survey was to investigate existing or anticipated water quality and ecological problems associated with CE activities in marshes and estuaries. Emphasis was placed on identifying those problems amenable to analysis through application of predictive modeling techniques. The identified problems represent the preceptions of the field personnel as interpreted by Science Applications, Inc. In some cases, perceived problems have been extensively researched or are being presently studied. The survey was designed to identify problems perceived by the field offices and may not reflect current understanding. Three general problems were emphasized by all offices: (a) the uniqueness of the specific environments in their District; (b) water quality and environmental problems are functions of local concerns of the public; and (c) there is a need to evaluate efforts of a change in physical regime on an estuary.

AD-A088 252/2 PC A05/MF A01
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Campbells Pond Dam (NJ00517). Rahway River Basin, West Branch Rahway River, Essex County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard McDermott. Jan 80, 90p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineering, Florham Park, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A088 253/0 PC A05/MF A01
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program, Pinecliff Lake Dam (NJ00012), Passiac River Basin, Belcher's Creek, Passaic County, New Jersey. Phase 1 Inspection Report.
Final rept.,
John P. Talerico. Feb 80, 86p
Contract DACW61-79-C-0011
Prepared in cooperation with Harris (Frederic R.), Inc., Woodbridge, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Includes envelope with chart.

This dam was inspected on 15 November and 5 December 1979 by Harris-ECI Associates, Inc. under contract to the State of New Jersey. The state, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367. Pinecliff Lake Dam, a high hazard potential structure, is judged to be in fair overall condition. However, the spillway is considered seriously inadequate because a flow equivalent to seven percent of the Probable Maximum Flood (PMF) would cause the dam to be overtopped. The seriously inadequate spillway is assessed as an UNSAFE, non-emergency condition, until more detailed studies prove otherwise or corrective measures are completed. The classification of UNSAFE applied to a dam because of a seriously inadequate spillway is not meant to indicate the same degree of emergency as would be associated with an UNSAFE classification applied for a structural deficiency. It does mean, however, that based on an initial screening, and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard of loss of life downstream from the dam.

AD-A088 254/8 PC A05/MF A01
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Clinton Mills Dam (NJ00122), Raritan River Basin, South Branch of Raritan River, Hunterdon County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott. Mar 80, 86p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineering, Florham Park, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This dam was inspected on 19 and 28 November 1979 by Storch Engineers under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, has this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367. Clinton Mills Dam, initially listed as a 'high' hazard potential structure, but reduced to a 'significant' hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillway is considered inadequate because a flow equivalent to five percent of the Spillway Design Flood - SDF- would cause the dam to be overtopped. (The SDF, in this instance, is one half of the Probable Maximum Flood.)

AD-A088 255/5 MF A01
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Darlington Lake Dam (NJ00230), Passaic River Basin, Darlington Brook, Bergen County, New Jersey. Phase I Inspection Report.
Final rept.,
John P. Talerico. Mar 80, 81p
Contract DACW61-79-C-0011
Prepared in cooperation with Harris (Frederic R.), Inc., Woodbridge, NJ. Original contains color plates: All DTIC and NTIS reproduction will be in black and white. Includes envelope with maps and graph.
Availability: Microfiche copies only.

This dam was inspected on 13 November and 3 December 1979 by Harris-ECI Associates, Inc., under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367. Darlington Lake Dam, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in good overall condition and the dam's spillway is considered adequate.

AD-A088 256/3 PC A05/MF A01
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Clinton Mills Dike (NJ00564), Raritan River Basin, South Branch of Raritan River, Hunterdon County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott. Mar 80, 78p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineering, Florham Park, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This dike was inspected on 5 and 28 December 1979 by Storch Engineers under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367. Clinton Mills Dike, a high hazard potential structure, is judged to be in fair overall condition. The spillway for the dike is located at Clinton Mills Dam (NJ00122) approximately 70 feet downstream from the dike.

AD-A088 260/5 PC **A04**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Hazardous Waste Surveys of Two Army Installations and an Army Hospital.
Final rept.,
D. Kraybill, T. Mullen, and B. Donahue. Aug 80, 63p Rept no. CERL-TR-N-90

This study describes a preliminary assessment of Army hazardous waste production and disposal requirements, as defined by the Resource Conservation and Recovery Act of 1976 and the Environmental Protection Agency's Proposed Guidelines and Regulations and Proposal on Identification and Listing of Hazardous Waste. This study examined hazardous waste production at two military installations and a major Army hospital. Six major hazardous wastes were found: (1) waste oil/petroleum oil lubricant (POL) products, (2) solvent tank bottom sludges, (3) paint wastes, (4) pesticides and insecticides, (5) PCBs, and (6) medical/infectious wastes. Descriptions of the study surveys as they were conducted are given. A hazardous waste survey format, developed during this study for use by Facilities Engineers, is also provided. (Author)

AD-A088 310/8 PC **A05**/MF **A01**
Air Force Engineering and Services Center Tyndall AFB FL Engineering and Services Lab
Phenolic Wastewater Treatment Alternatives.
Final rept. Aug 79-Feb 80,
Robert G. Blum. Jun 80, 77p Rept no. AFESC/ESL-TR-80-18

The Air Force uses phenol compounds primarily in its paint stripping and carbon removal operations, the major portions of which are performed at the Air Logistics Centers (ALCs). Depending on the type operation, the spent phenol either enters the industrial/sanitary waste stream, or is removed and disposed of by a contractor. Several Air Force bases, particularly the ALCs, are experiencing difficulty in meeting increasingly stringent National Pollution Discharge Elimination System (NPDES) permit standards for phenols. In addition, new regulations being promulgated under the Resource Conservation and Recovery Act (RCRA) will impact upon certain treatment and disposal practices. Therefore, the principal objective of this study is to determine the most cost-effective process(es) for the treatment and disposal of these wastes in accordance with existing and proposed environmental regulations. A literature review is conducted which examines the following systems/processes Granular Activated Carbon (GAC) adsorption, ozone oxidation, hydrogen peroxide oxidation, potassium permanganate oxidation, iron (VI) ferrate oxidation, catalytic oxidation, chlorine oxidation, chlorine dioxide oxidation, aeration, recovery, incineration, pyrolysis, landfilling, activated sludge, trickling filter and source control. The results of the cost analyses show that biological processes are by far the most cost-effective alternative for the treatment of paint stripping wastewater at the source. Biological systems are also the most cost-effective for treatment of phenolic wastewater at the industrial or sanitary wastewater treatment plant, closely followed by ozone oxidation.

AD-A088 371/0 PC **A18**/MF **A01**
Community Design Center Inc Milwaukee WI
Case Studies of Child Play Areas and Child Support Facilities.
Final rept. Jun-Aug 78,
Uriel Cohen, Gary T. Moore, and Tim McGinty. Aug 78, 415p
Contract DACA73-78-C-0005
Prepared in cooperation with Wisconsin Univ., Milwaukee. Center for Architecture and Urban Planning Research, Rept. no. R78-2.

This report describes and evaluates 50 facilities and settings for play, child care, and early childhood development. The evaluation is part of a long-range project for the U.S. Army Corps of Engineers to specify new guidelines for the design of child care facilities and play areas at military establishments around the country. The objectives of the research were: (1) to sensitize the client organization to the role of the physical environment in child play, care, and early development, (2) to comparatively document and assess a sample of both military and civilian care facilities and play areas, and (3) to identify key design features and physical patterns which facilitate child development.

ANL/CEN/FE-79-13 PC **A04**/MF **A01**
Argonne National Lab., IL.
Regeneration of Sulfated Limestone from FBCs. Annual Report, October 1978-September 1979.
I. Johnson, D. S. Moulton, F. F. Nunes, W. M. Swift, and F. G. Teats. 1979, 61p
Contract W-31-109-ENG-38

These studies are concerned with the development of processes for the regeneration of sulfated limestone from fluidized-bed combustors. The results of cyclic combustion/regeneration experiments on three limestones are reported. The reactivity of a low-reactivity limestone, Germany Valley, did not change significantly during cyclic combustion/regeneration. Studies of a high-reactivity limestone, Greer, at lower regeneration temperatures (1050 exp 0 C) indicated an apparently better performance than at 1100 exp 0 C. The sorbent utilization of type 2203 limestone in a three-cycle experiment was similar to that of Greer. The results of studies of a process for the recovery of elemental sulfur from SO sub 2 involving reaction with fly ash or coal ash-coal combinations are reported. The residual carbon in the fly ash was found to be an effective reductant for the SO sub 2 and high-purity sulfur was obtained. Regeneration of spent limestone sorbent in externally fired rotary kilns was accomplished, but only under conditions that resulted in rapid attack of the kiln materials by SO sub 2 . (ERA citation 05:030159)

BNL-27264 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Diffusion Battery Sampling of Sulfuric Acid Aerosols Formed in Oleum Spill Experiments.
I. N. Tang, W. T. Wong, and H. R. Munkelwitz. 1980, 18p CONF-800807-1
Contract AC02-76CH00016
AICHE symposium on developments in air pollution sampling and analysis, Seattle, WA, USA, 10 Aug 1980.

Fuming sulfuric acid (oleum) is one of several hazardous chemicals routinely transported in bulk quantities on US waterways. In the event of a marine accident, a large amount of the cargo acid could suddenly be released into water, resulting in the formation of a dense sulfuric acid cloud. Experiments were carried out in the laboratory to study the factors controlling the extent of acid aerosol formation under conditions likely to occur in maritime spill accidents. A Sinclair-type diffusion battery was used for aerosol sizing. In this presentation, a brief discussion of an improved nonlinear iterative inversion method for the analysis of diffusion battery data is given. Experimental results obtained with monodisperse test aerosols and sulfuric acid aerosols formed during oleum spills are presented. It is shown that the diffusion battery, coupled with the inversion technique, is capable of sizing particles up to 0.8 mu m in diameter. (ERA citation 05:031158)

BNL-27597 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Yield Responses of Field-Grown Soybeans Exposed to Simulated Acid Rain.
L. S. Evans, C. A. Conway, and K. F. Lewin. Mar 80, 9p CONF-800365-2
Contract AC02-76CH00016
International conference on the ecological impact of acid precipitation, Sandefjord, Norway, 11 Mar 1980.

An important area of interest is to determine the effects of acid precipitation on the yield of agronomic crops under field conditions. Experiments described herein were performed with field-grown soybeans at Brookhaven National Laboratory during the summer of 1979. A preliminary experiment was performed the preceding year at the same site to estimate the most appropriate plot design and statistical analyses. Soybeans were seeded to provide six Latin Squares. Five treatments (no rain, simulated rainfalls of pH levels of 4.0, 3.1, 2.7, and 2.3) replicated five times in each Latin Square were used to produce a total of 30 plots per treatment. These results show that additions of small amounts of simulated acid rain to soybeans decreased the number of pods per plant. This decrease in the number of pods per plant produced a small but significant decrease in seed mass. The decreases (3, 5 and 8% at simulated rain pH levels of 4.0, 3.1, and 2.7) were present in soybeans already exposed to rainfalls at Brookhaven National Laboratory with an average H exp + concentration of about pH 4.0 over the period of this experiment. (ERA citation 05:031228)

BNL-28141 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Temporal Perspective on Acid Deposition Research.
G. R. Hendrey. 20 Feb 80, 14p
Contract AC02-76CH00016

This statement presented to the Subcommittee on Natural Resources of the US House of Representatives gives a definition of acid rain, presents new data on the regional and temporal nature of the problem, and discusses research needs. (ERA citation 05:031143)

CEA-R-4985 PC **A04**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
Study of Aerosol Retention in Sampling Ducts. Application to the Measurement of Radioactive Contamination.
J. Charuau. Jun 79, 55p
In French.
U.S. Sales Only.

The measurement of radioactive aerosol concentrations in monitored laboratories is often operated after the sampled particles have been carried into a cylindrical duct. By retention of some particles, the duct may lead to an important reduction of concentration measurements. The various deposit mechanisms are summed up and some bibliographic data are added. An experimental study was carried out in situ for a complex form duct installed for the atmospheric contamination control and for two vertical ducts of a different nature. Using non radioactive trial aerosols the effects of the ducts on retention, of particle sizes from 10 exp -12 to 10 mu m, of their state of electrical charge, of the conducting or isolating nature of the wall duct and of the air carrier flow rate for Reynolds number from 3500 to 7000 were observed. The experimental results were compared with theoretical calculations. The relative influence of the different parts making a complex form duct on particle retention in relationship with their size and the air flow are shown. Finally, taking account of recent information concerning the electrical charge state of radioactive particles, the high retention values observed for charges particles, 2 mu m in diameter, should be noticed. (Atomindex citation 11:508360)

CONF-800635-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Reducing Residential Energy Growth with More Efficient Space Heating Equipment.
D. L. O'Neal, and E. A. Hirst. 1980, 18p
Contract W-7405-ENG-26
Conference of the American Society of Heating, Refrigeration and Air Conditioning Engineers, Denver, CO, USA, 22 Jun 1980.

Several energy-saving designs changes in residential space heating systems were examined to determine their energy conservation potential and cost effectiveness. Changes in conventional and advanced systems (such as gas heat pumps) were considered. Energy savings as large as 26, 20, and 57% were estimated for design changes in conventional gas, oil, and electric space heating systems, respectively. These changes increased capital cost of the three systems by 27, 16, and 26%. For advanced gas and electric systems, energy savings up to 45 and 67%, respectively, were calculated. The design changes needed to produce these energy savings increased capital costs 60 and 35%. The energy use and cost relationships developed for the space heating systems were used as input to the ORNL residential energy use simulation model to evaluate the effect of space heating improvements on national energy use to the year 2000. With no efficiency improvements in equipment, space heating energy grew at 2.5%

per year. When improved conventional and advanced systems were introduced in the market, heating energy growth was cut to 1.8% and 1.6% per year, respectively. In addition, if consumers were to minimize life cycle costs in pruchasing space heating equipment, space heating energy growth was projected to grow at 1.1% per year. (ERA citation 05:027315)

COO-1199-60 PC **A06/MF A01**
Illinois State Water Survey, Urbana.
Study of Atmospheric Pollution Scavenging. Eighteenth Progress Report.
R. G. Semonin, J. D. Bartlett, V. C. Bowersox, D. F. Getz, and D. Q. Naiman. Jul 80, 102p
Contract AS02-76EV01199

The analysis of aerosol samples obtained in rural east-central Illinois reveals a seasonal maximum in SO sub 4 during May to July and a similar pattern for NH sub 4 . The annual median SO sub 4 is about 1 to 1.5 mu g/m exp 3 . In contrast to these ions, NO sub 3 displays highest values in the cold season. Soil-related species (Ca, K) seem to maximize in relation to farm tillage and harvesting practices. The NO sub 3 in recent precipitation samples over the northeast US increased between 1 and 2 times the values observed in the mid-1950's. A case study from SCORE-78 suggests that all ion concentrations analyzed from sequentially collected samples decreased from the onset of rain to a minimum corresponding to the heaviest rain rates. Four groups of elements in 10 event rain samples were identified using factor analysis. The groups include soluble and insoluble crustal elements, soluble pollutant metals and sulfate, and insoluble pollutant metals. Utilizing the factor analysis approach, the St. Louis METROMEX precipitation chemistry data showed that the SO sub 4 deposition patterns group consistently with those of other soluble pollutants. Additional factor analysis efforts on the St. Louis rainwater data set revealed that soluble and insoluble concentrations of a given element have different deposition patterns suggesting that scavenging and/or precipitation formation processes dictate the patterns. An approach to managing the vast data base of rain chemistry used in the above studies is described. The software also examines the data for certain aspects of quality assurance. The procedures used to analyze ambient air filter samples are discussed. (ERA citation 05:031123)

COO-4596-1(V.3)(App)(5-79) PC **A16/MF A01**
Radian Corp., Austin, TX.
DART II Documentation. Volume III. Appendices.
23 May 79, 368p
Contract EY-77-C-02-4596

The DART II is a data acquisition system that can be used with air pollution monitoring equipment. This volume contains appendices that deal with the following topics: adjustment and calibration procedures (power supply adjustment procedure, ADC calibration procedure, analog multiplexer calibration procedure); mother board signature list; schematic diagrams; device specification sheets (microprocessor, asynchronous receiver/transmitter, analog-to-digital converter, arithmetic processing unit, 5-volt power supply, +- 15-volt power supply, 24-volt power supply, floppy disk formater/controller, random access static memory); ROM program listing; 6800 microprocessor instruction set, octal listing; and cable lists. (ERA citation 05:031102)

DOE/CS/20094-01 PC **A20/MF A01**
Department of Energy, Washington, DC. Office of Buildings and Community Systems.
Dutchess County Resource Recovery Task Force Report: Dutchess County Pyrolysis Program.
Jul 80, 461p
Contract FG01-78CS20094

Dutchess County initiated development of a long-range master plan for Solid Waste Management in 1971. The plan included development of a resource recovery facility to service the municipalities in the County population center. Based on early recommendations, a pyrolysis facility employing Purox technology was to be implemented. A feasibility study, paid for by County funds was completed in 1975. The study provided siting recommendations, estimation of available waste, and preliminary facility design. Because of various considerations, the project was not developed. Under the Department of Energy grant, the County reassessed the feasibility of a resource recovery facility, with emphasis on confirming previous conclusions supporting the Purox technology, waste availability, energy recovery and sale and siting of the plant. The conclusions reached in the new study were: a resource recovery facility is feasible for the County; sufficient waste for such a facility is available and subject to control; While Purox technology was feasible it is not the most appropriate available technoloy for the County; that mass burning with steam recovery is the most appropriate technology; and that resource recovery while presently more expensive than landfilling, represents the only cost effective, energy efficient, and environmentally sound way to handle the solid waste problem in the County. (ERA citation 05:030783)

DOE/EV-0084 PC **A04/MF A01**
Department of Energy, Washington, DC. Div. of Environmental Control Technology.
Environmental-Control-Technology Activities of the Department of Energy in FY 1979.
Jun 80, 52p

This report provides an annual identification and summarization of environmental control RD and D activities and associated funding conducted by DOE in conjunction with developing environmentally acceptable energy technologies. Environmental control technology is an integral part of the DOE energy technology R, D, and D effort. As the third in a series of annual reports on environmental control R, D, and D activities within DOE, this report may serve as a basis for evaluating program trends. The report presents background material that contributes to the capability to evaluate and assess the environmental control accomplishments, issues, gaps, and overlaps associated with energy development within DOE, in conjunction with other agencies, and in the private sector. A measure of the change in emphasis in the environmental control technology activities within DOE is also presented, indicating shifts, if any, in funding levels for each of the energy technologies. Total DOE FY 1979 budget outlay allocated to environmental control activities was $421,533,000, or 5.0% of the total FY 1979 DOE budget. This report summarizes the inputs received from the energy technology areas. These inputs were submitted in accordance with a description of environmental control related activities, which are those activities directed at research, development, and demonstration of processes, procedures, systems, subsystems, and strategies that directly or indirectly eliminate, minimize, or mitigate environmental impacts. 25 references, 10 figures, 40 tables. (ERA citation 05:029173)

DOE/EV-0086 PC **A16/MF A01**
Development Engineering, Inc., Rifle, CO.
Paraho Environmental Data. Part I. Process Characterization. Par II. Air Quality. Part III. Water Quality.
R. N. Heistand, R. A. Atwood, and K. L. Richardson. Jun 80, 352p
Contract AC02-78EV04708

From 1973 to 1978, Development Engineering, Inc. (DEI), a subsidiary of Paraho Development Corporation, demostrated the Paraho technology for surface oil shale retorting at Anvil Points, Colorado. A considerable amount of environmentally-related research was also conducted. This body of data represents the most comprehensive environmental data base relating to surface retorting that is currently available. In order to make this information available, the DOE Office of Environment has undertaken to compile, assemble, and publish this environmental data. The compilation has been prepared by DEI. This report includes the process characterization, air quality, and water quality categories. (ERA citation 05:030221)

DOE/EV-0087 PC **A99/MF A01**
Department of Energy, Washington, DC. Office of Technology Impacts.
Synthetic Fuels and the Environment: An Environmental and Regulatory Impacts Analysis.
Jun 80, 652p

Since July 1979 when DOE/EV-0044 report Environmental Analysis of Synthetic Liquid fuels was published the synthetic fuels program proposals of the Administration have undergone significant modifications. The program year for which the development goal of 1.5 million barrels per day is to be reached has been changed from 1990 to 1995. The program plan is now proposed to have two stages to ensure, among other things, better environmental protection: an initial stage emphasizing applied research and development (R and D), including environmental research, followed by a second stage that would accelerate deployment of those synthetic fuel technologies then judged most ready for rapid deployment and economic operation within the environmental protection requirements. These program changes have significantly expanded the scope of technologies to be considered in this environmental analysis and have increased the likelihood that accelerated environmental R and D efforts will be successful in solving principal environmental and worker safety concerns for most technologies prior to the initiation of the second stage of the accelerated deployment plan. Information is presented under the following section headings: summary; study description; the technologies and their environmental concerns (including, coal liquefaction and gasification, oil shale production, biomass and urban waste conversion); regulatory and institutional analyses; and environmental impacts analysis (including air and water quality analyses, impacts of carbon dioxide and acid rain, water availability, solid and hazardous wastes, coal mining environmental impacts, transportation issues, community growth and change, and regional impacts). Additional information is presented in seventeen appendixes. (ERA citation 05:031167)

DOE/EV/02874-59 PC **A03/MF A01**
Stanford Univ., CA. Dept. of Statistics.
Misspecification of Trend in Spatial Random-Function Interpolation with Application to Oxidant Mapping. Technical Report No. 28.
R. Faith, and R. Sheshinski. Sep 79, 49p
Contract EY-76-S-02-2874

In epidemiological studies of the effects of air pollution it is desirable to obtain estimates of the exposure to various pollutants of persons living throughout a geographical region under study. It is typically the case that pollution levels are measured at only a few locations. The problems of interpolating these values and of determining the accuracy of interpolation are amenable to analysis by way of spatial stochastic models. Such models can lead to an optimal interpolation technique, in a manner which is reviewed here. Estimators based on a correctly and incorrectly specified constant mean are compared with estimators based on an unspecified constant mean. The ratios of the mean squared errors (MSE) decreases with decreasing correlation between observations, and are very close to one. Estimation done with a specified linear trend function to estimation are compared with an unspecified linear trend function. For interpolation, the MSE's tend to be close except for high underlying correlation models. For extrapolation - the MSE values can be very different. A biased partially constrained estimator versus a fully constrained universally unbiased estimator in the presence of a linear trend is discussed. The biased and unbiased estimators have similar performance, except for very steep linear slopes of the trend. The comparisons of these sections are made in the context of rather special and perhaps unrealistic model assumptions. The Kriging method is used for interpolating (mapping) values of oxidant levels from 1973 at 16 stations located in the San Francisco Bay Area. Constant and linear trends are used for the purpose. The method requires knowledge of the spatial covariance structure of the pollutant to which it is applied. Some difficulties encountered in estimating this for oxidant levels in the San Francisco Bay Area are mentioned. (ERA citation 05:031124)

DOE/EV/04327-1 PC **A03/MF A01**
Minnesota Univ., Minneapolis.
Chemical Composition of Atmospheric Precipitation in Minnesota and North Dakota. Final Report, July 1, 1977-Jun 30, 1980.
Jul 80, 31p
Contract AS02-77EV04327

Precipitation chemistry in central North American appears to e controlled by interaction between soil-derived alkaline dust and gaseous NH sub 3 from the cultivated prairie and anthropogenic acid aerosols from the urban-industrial Lower Great Lakes-Ohio Valley region. Analyses of major ions and trace metals in precipitation event and snow core samples along a 600-km transect from the North Dakota prairie to the northeastern Minnesota forest indicate that loadings and concentrations of Ca exp ++ , Mg exp ++ , P/sub tot/, Al, Fe, M/sub n/, and other soil-derived material decrease with increasing distance from the prairie. Acidity is highest in the east and decreases to the west. Sulfate has natural sources in the west and anthropogenic sources in the east; its concentration was least at sites in the middle of the transect. Acidity increased and inputs of soil-derived elements decreased during winter when snow and freezing temperatures reduced alkaline influxes to the region. Atmospheric inputs of N and P may be beneficial to nutrient-poor ecosystems. However, precipitation in the eastern portions of the region which are highly sensitive to acid inputs, is approaching levels of acidity known to cause adverse effects. Any increase in acid loading will increase this danger. (ERA citation 05:031125)

DOE/EV/10281-T1 PC **A02**/MF **A01**
Aspen Inst. for Humanistic Studies, Boulder, CO.
Global Political System's Perspective to Climate-Society Interactions.
R. Schware. 1980, 23p
Contract AC02-79EV10281

The purpose of this paper is to suggest some of the principal elements that might be useful in the development of a general theory of the climate-society interaction, to point out some of the pathways and linkages among political components involved in coping with climatic impacts, and to identify some obstacles, strategies, and incentives that apply to making policy choices related to climate. (ERA citation 05:031112)

DOE/NV/00410-60 PC **A08**/MF **A01**
Reynolds Electrical and Engineering Co., Inc., Las Vegas, NV.
Environmental Surveillance Report for the Nevada Test Site, January-December 1979.
M. W. Lantz. Jun 80, 166p
Contract AC08-76NV00410

The environmental surveillance program at the Nevada Test Site as conducted by the Department of Energy (DOE) onsite radiological safety contractor is documented from January 1979 through December 1979. The results and evaluations of measurements of radioactivity in air and water, and of direct gamma radiation exposure rates are presented. Relevancy to DOE concentration guides (CG'S) is established. (ERA citation 05:029601)

DP-MS-79-76 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Evaluation of a Modified Gaussian Plume Model for Travel Distances 25 to 150 KM.
J. C. Huang. 1980, 18p CONF-800327-13
Contract AC09-76SR00001
Joint conference on applications of air pollution meteorology, New Orleans, LA, USA, 24 Mar 1980.

Gaussian plume model was developed and evaluated using observed Kr-85 air concentration data. The main features of the model include: segmented plumes and displaced effective source terms; reflective upper and lower boundaries; and formulations describing the effects of time-varying mixing height. The model was evaluated in terms of goodness factor, root mean square error, percentage of hits, and percentage of observed and calculated concentrations within a factor of 2 and 10. The test results show that this model predicts observed concentrations fairly well and is superior to the simpler wind rose and segmented plume models. Moreover, the prediction capability of the modified Gaussian model is also found to be insensitive to plume travel distances up to 150 kilometers. (ERA citation 05:029602)

DP-MS-80-13 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Investigation of Multi-Dimensional Computational Models for Calculating Pollutant Transport.
D. W. Pepper, R. E. Cooper, and A. J. Baker.
1980, 16p CONF-800492-1
Contract AC09-76SR00001
Southeastern conference on theoretical and applied mechanics, Knoxville, TN, USA, 17 Apr 1980.

A performance study of five numerical solution algorithms for multi-dimensional advection-diffusion prediction on mesoscale grids was made. Test problems include transport of point and distributed sources, and a simulation of a continuous source. In all cases, analytical solutions are available to assess relative accuracy. The particle-in-cell and second-moment algorithms, both of which employ sub-grid resolution coupled with Lagrangian advection, exhibit superior accuracy in modeling a point source release. For modeling of a distributed source, algorithms based upon the pseudospectral and finite element interpolation concepts, exhibit improved accuracy on practical discretizations. (ERA citation 05:029587)

EPRI-CS-1428 PC **A10**/MF **A01**
Bechtel National, Inc., San Francisco, CA.
Economic and Design Factors for Flue Gas Desulfurization Technology. Final Report.
Apr 80, 206p

A review of nine published FGD cost estimates exhibited wide variations in both estimated and actual FGD costs. These variations often reach factors of three to five times the costs at the lower end of the cost range. The major causes of these cost variations have been determined and standard design and economic assumptions and methodology suggested to reduce their magnitude. Conceptual designs and cost estimates are presented for the limestone slurry, lime slurry, double alkali, Chiyoda Thoroughbred 121, Wellman-Lord, magnesia slurry, absorption/steam stripping/Resox, and the lime slurry/spray drier/fabric filter processes. For both low- and high-sulfur coal applications, the alkali-based nonregenerable processes exhibited the lowest capital and levelized revenue requirements and the lowest parasitic energy consumptions. The Chiyoda Thoroughbred 121 process appears particularly attractive. It exhibits low total capital and levelized revenue requirements and also produces a stackable gypsum byproduct. The spray drier/fabric filter process using a lime slurry is also attractive, but has not yet been demonstrated for high-sulfur coal applications. The economics of absorption/steam stripping and other regenerable processes are adversely affected by high energy consumption, principally for regeneration of the scrubbing reagent. EPRI is evaluating improvements in the absorption/steam stripping/Resox process that could reduce both energy consumption and equipment costs. Generalized cost estimates such as those presented should be used only as comparative estimates for research and development planning and FGD process screening. Since the estimates are based on a specific set of assumptions, it is not appropriate to generalize these estimates or assume they represent manufacturers' current, site-specific selling prices. (ERA citation 05:030128)

EPRI-EA-1452 PC **A05**/MF **A01**
Aeronautical Research Associates of Princeton, Inc., NJ.
Modeling of Dry Deposition of SO sub 2 and Sulfate Aerosols. Final Report.
W. S. Lewellen, and Y. P. Sheng. Jul 80, 87p

A model for dry deposition of SO sub 2 and sulfate aerosol is formulated, and calculations are made for four flow regimes; the outer boundary layer, the constant-flux region, within the vegetative canopy, and the viscous sublayer next to a smooth surface. The results of calculations are presented to demonstrate sensitivity of deposition to atmospheric stability, surface resistance, plant area density and structural shape, aerosol particle size, and Rossby number and canopy Reynolds number. A simple parameterized model for the SURE regional model is constructed. (ERA citation 05:031126)

IAEA-R-1818-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Environmental Radiation Monitoring in Costa Rica. Final Report for the Period 1 October 1976 - 1 May 1979.
H. Marenco Zuniga. Jun 79, 2p
U.S. Sales Only.

The environmental natural radiation background was measured. It was found that the environmental exposure of the population at sea level in Costa Rica is lower than that for middle and high latitudes probably due to the deviation of charged particles by the terrestrial magnetic field. There are no environmental radiation anomalies in the populated areas. Although the environmental natural radiation exposure at sea level is lower than it is at higher latitudes, the actual exposure for most of the population is approximately equal to those living in cities between 40-50 exp 0 latitude, because the central plateau is at 1000-1200 meter above sea level. (Atomindex citation 11:508415)

NP-24448 PC **A07**/MF **A01**
Syncrude Canada Ltd., Edmonton (Alberta).
Revegetation and Management of Tailings Sand Slopes from Tar Sand Extraction: 1978 Results.
M. J. Rowell. 1979, 145p
U.S. Sales Only.

The results are reported of research into the revegetation of two areas on a steeply sloping dike composed of tailings sand from tar sand extraction at the Great Canadian Oil Sand Limited plant at Fort McMurray, Alberta. One area was seeded with three pasture grasses and two legumes in 1971 after the slope surface had been mixed with peat to a depth of 15 cm. A second area had been amended with peat or peat and overburden and differing rates of fertilizer added. A mix containing nine grasses, four legumes, and oats, as a companion crop, was seeded in July 1976. The objectives of the research were to study methods for the establishment of a stable vegetative cover that would prevent erosion of the slope and, in time, might become a self maintaining unit. Tillage of soil amendments to a depth of 15 cm and 30 cm were compared in promoting deeper rooting and stabilizing of the slope. (ERA citation 05:030222)

NP-24449 PC **A02**/MF **A01**
Syncrude Canada Ltd., Edmonton (Alberta).
Reclamation Research for the Future at Syncrude Canada Ltd.: Soil Simulation-Revegetation Studies on Tailings Sand.
A. W. Fedkenheuer, and J. Browne. Dec 79, 8p
U.S. Sales Only.

In response to the rising demand for energy in today's world, oil extracted from oil sands has become a viable energy source. Syncrude Canada Ltd. is a 2.2 billion dollar oil sands surface mining and processing venture situated in the Athabasca oil sands of northeastern Alberta. It is located near the town of Fort McMurray approximately 420 km north of Edmonton. During its planned 25 years of mine life, Syncrude expects to produce more than 1 billion barrels of oil from a 2800 ha mine area. Syncrude is committed to reclaiming this immense mine area. The reclamation objective is to return the disturbed site to a vegetative cover having a productivity which is equal to or greater than that which existed prior to disturbance. The reclaimed area must also be compatible with the neighboring natural areas. To accomplish this the vast quantities of tailings sand (that is, the leftover sand from which the oil has been extracted) must be reformed into a soil which is capable of supporting native plant communities. Researchers at Syncrude are looking for ways to use indigenous materials with the tailings sand to simulate a naturally-formed soil. Native plant species are being tested to see how well they will grow in such simulated soils and to evaluate their potential for use in large scale reclamation projects. This brochure describes the soil simulation-revegetation experiments going on at Syncrude. (ERA citation 05:030223)

NP-24453 PC **A11**/MF **A01**
Syncrude Canada Ltd., Edmonton (Alberta).
Concentration Fluctuations in Plumes. Environmental Research Monograph, 1979-4.
D. D. J. Netterville. 1979, 228p
U.S. Sales Only.

The random fluctuation of concentration levels in a plume is studied using a wind tunnel simulation of dispersion in the neutrally stable atmospheric boundary layer. A fast response hot-film probe is developed and used to measure high frequency fluctuations of helium tracer concentration in the wind tunnel. Plume intermittency is well described by a Gaussian error function model originally developed for turbulence intermittency in round free jets. The classic reflected Gaussian model for mean concentrations successfully reproduces the spatial distribution of mean concentration in the elevated tracer plume. An expression for the mean field eddy diffusivity is obtained from the reflected Gaussian model, and compares favorably with experimentally-derived values. For non-uniform winds, the vertical eddy diffusivity has a complex variation with height above ground, becoming discontinuous near the source height. (ERA citation 05:031127)

N80-30079/1 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
A Fast Garbage Compaction Algorithm.
H. B. M. Jonkers. Mar 79, 21p MC-IW-107/79
Submitted for Publication.

A compaction algorithm for variable size storage elements is described for use in a compacting garbage collector. Under certain plausible assumptions on the structure of these storage elements, the algorithm requires no space overhead and is faster than any compaction algorithm published to date. It scans the area to be compacted twice, but examines pointers only once.

ORAU/IEA-80-9(M) PC **A03**/MF **A01**
Oak Ridge Associated Universities, Inc., TN. Inst. for Energy Analysis.
Constraints on Carbon Dioxide Production from Fossil Fuel Use.
R. M. Rotty, and G. Marland. May 80, 37p
Contract AC05-760R00033

The exponential growth of fossil fuel use over recent decades has resulted in a 4.3% annual increase in the carbon dioxide emitted to the atmosphere. The question addressed here is, when (and to what extent) will constraints limit the use of fossil fuels and the subsequent production of CO sub 2 . Three types of possible constraints are discussed: resource constraints, fuel-demand constraints, and environmental constraints. An analysis of the next 50 years suggests that resource constraints will not provide severe limits. Fuel-demand constraints will probably limit the use of fossil fuels to levels that keep the atmospheric carbon dioxide concentration below 450 ppM(v) for the next 50 years, so that the impacts of atmospheric carbon dioxide will not cause mankind to take action soon. In spite of this conclusion a continuing, long-term problem is foreseen and full efforts to understand and continually monitor the CO sub 2 problem should be made and alertness to any changes that may require action should be maintained. (ERA citation 05:027684)

ORNL-5425 PC **A13**/MF **A01**
Oak Ridge National Lab., TN.
Costs and Technical Characteristics of Environmental Control Processes for Low-Btu Coal Gasification Plants.
S. P. N. Singh, R. Saimon, J. F. Fisher, and G. R. Peterson. Jun 80, 299p
Contract W-7405-ENG-26

Technical characteristics and costs of 25 individual environmental control processes that can be used for treating low-Btu coal gas are given. These processes are chosen from a much larger array of potential environmental control processes because of their likely applicability to low-Btu coal gasification operations and because of the limited scope of this study. The selected processes cover gas treating, by-product recovery, wastewater treating, and particulate recovery operations that are expected to be encountered in coal gasification operations. Although the existence of the Resource Conservtion and Recovery Act of 1976 is recognized, no treatment schemes for solid wastes are evaluated because of the paucity of information in this area. The potential costs of emission controls (by using eight integrated combinations of these 25 environmental control processes) in conceptual low-Btu coal gasification plants are given in an adjunct report titled Evaluation of Eight Environmental Control Systems for Low-Btu Coal Gasification Plants, ORNL-5481. (ERA citation 05:030102)

ORNL-5460 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Radiological Survey of the Inactive Uranium-Mill Tailings at the Spook Site, Converse County, Wyoming.
F. F. Haywood, D. J. Christian, K. D. Chou, B. S. Ellis, and D. Lorenzo. May 80, 74p
Contract W-7405-ENG-26

Results of a radiological survey performed at the Spook site in Converse County, Wyoming, in June 1976, are presented. The mill at this site was located a short distance from the open-pit mine where the ore was obtained and where part of the tailings was dumped into the mine. Several piles of overburden or low-grade ore in the vicinity were included in the measurements of above-ground gamma exposure rate. The average exposure rate over these piles varied from 14 mu R/hr, the average background exposure rate for the area, to 140 mu R/hr. The average exposure rate for the tailings and former mill area was 220 mu R/hr. Movement of tailings particles down dry washes was evident. The calculated concentration of exp 226 Ra in ten holes as a function of depth is presented graphically. (ERA citation 05:031146)

ORO-4700 PC **A03**/MF **A01**
Arkansas Univ., Fayetteville. Dept. of Agronomy.
Dissolution and Transport of Plutonium from Oxide Particles in Soils.
D. A. Brown. 1978, 34p
Contract AS05-76EV04700

This report contains a summary of methods and data on plutonium dissolution and movement in four soils, plus a copy of a manuscript describing the automatic sample changer for alpha radiation detection which has been submitted for publication. (ERA citation 05:029617)

PB80-213432 PC **A04**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Environmental Sources of Trichloroethylene Exposure: Source Contribution Factors.
Final rept.,
Myles E. Morse. May 80, 75p EPA-560/11-80-009
Contract EPA-68-01-5863

This study is intended to assist the Assessment Division, Office of Testing and Evaluation of the U.S. Environmental Protection Agency, in the assessment of human health risks associated with trichloroethylene exposure. The levels and frequency of occurrence of trichloroethylene in the various environmental media (air, food, and drinking water) have been identified. The relative contribution of each of these sources to an individual's total daily trichloroethylene uptake is determined through an exposure/uptake approach. It is anticipated that such an approach in combination with other exposure information can be used in the support of regulatory decision making under the Toxic Substances Control Act (TSCA). Available occurrence data, although limited, indicate a greater persistence of trichloroethylene in ground water than in the atmosphere or surface water. Numerous instances of trichloroethylene occurrence in drinking water (supplied by aquifers) were cited. The suggested no adverse response level was found to be exceeded in all situations considered above the average value scenario. The fetus, children and those consuming ethyl alcohol were subunits of the general population qualitatively identified as hypersensitive to trichloroethylene.

PB80-215577 PC **A16**/MF **A01**
Southern California Association of Governments, Los Angeles.
Regional Transportation Plan Amendment: Aviation Element.
Draft environmental impact rept. 1978-80,
Joanne Freilich, and Michael Armstrong. Jul 80, 362p
Grant DOT/FAA-M-06-0401-04/05

This report documents the environmental impacts of a recommended 1995 regional air carrier airport system. This system is designed to meet Southern California's future air travel needs by 1995 and beyond. Additional airport capacity would be provided primarily by a proposed new offshore airport in the Los Angeles-Long Beach Harbor Area. Existing air carrier airports would be constrained at activity levels set by current policies. The report documents a systems-level environmental assessment of this recommended system. Two alternative systems are also analyzed, which both lack a new airport, including one with policy constraints in place, and another with policy constraints removed.

PB80-215999 PC **A06**/MF **A01**
Urban Mass Transportation Administration, Washington, DC. Office of Transportation Management.
Urban Mass Transportation Abstracts. Volume Number 6.
Bibliography rept. Jan-Dec 79.
Dec 79, 172p UMTA-TRIC-79-1
See also report dated Dec 78, Volume 5, PB-297 355.

The report is the sixth edition of the Urban Mass Transportation Abstracts--compilation of abstracts of all reports published in 1979 describing results of various research, development, and demonstration activities of the Urban Mass Transportation Administration (UMTA). This document reflects UMTA's continuing commitment to the dissemination of technical report information to government, state, and local transportation agencies; private industry; and the general public. This general reference document is intended to serve as an index to reports generated under contract to UMTA.

PB80-216195 PC **A06**/MF **A01**
Simpson and Curtin, Philadelphia, PA.
Camden County Coordinated Mass Transportation Systems Study. Phase II.
Final rept.
Jun 80, 116p UMTA-IT-09-0050-80-1
See also Appendices, PB80-216203. Sponsored in part by Camden County Planning Board, NJ.

The 1970s set in motion a continuing transportation planning program that would provide an efficient and cost effective system of public transportation services for Camden County. Camden County initiated a systematic planning effort--the Coordinated Mass Transit Systems (CMTS) Study--to analyze the transportation needs of the county residents and subsequently to develop a transportation improvement program. Phase I of the CMTS study was completed in July 1977, and it focused on specific transportation issues such as an assessment of the quality of service; evaluation of public information programs; and the role of the county in public transportation. Phase II work was completed in June 1979. Phase II study, this report, focused on three areas: (1) feasibility of park-n-ride express bus service between the future PATCO Berlin Station site and the Lindenwold Station; (2) analysis of all paratransit services; and (3) analysis of all fixed-route transit services in the county. This report documents the evaluation steps and the recommendations of the CMTS Phase II study. It also contains an Executive Summary that highlights the principal conclusions and recommendations of both Phase I and Phase II study efforts. The CMTS Phase II study has recommended a specific implementable plan to improve mobility in Camden County. The recommendations developed during this study are summarized herein as well as the discussions of each of the three study areas. This study recommended that Camden County establish a program to improve coordination between services operated by municipalities, TNJ (Transport of New Jersey), PATCO, and Social Service Agencies.

PB80-216575 PC **A05**/MF **A01**
California Univ, Riverside. Dept. of Soil and Environmental Sciences.
Land Disposal of Hexachlorobenzene Wastes Controlling Vapor Movement in Soil.
Rept. for 14 Jun 74-13 Sep 76,
Walter J. Farmer, Ming-Shyong Yang, John Letey, and William F. Spencer. Aug 80, 82p EPA-600/2-80-119
Contract EPA-68-03-2014
Prepared in cooperation with Science and Education Administration, Riverside, CA.

Hexachlorobenzene (HCB) is a persistent, fat-soluable organic compound of low aqueous solubility present in some industrial wastes. Transport in water moving through soil will be negligible but its long term persistence and appreciable vapor pressure allows significant volatilization to occur. Conditions for soil covers that would control the movement of HCB out of landfills and other disposal/storage facilities into the surrounding atmosphere were studied. The volatilization fluxes of HCB from industrial wastes (hex wastes) were determined in a simulated landfill under controlled laboratory conditions. Coverings of water and soil were found to be highly efficient in reducing volatilization. Polyethylene film was less efficient when compared on a cost basis. Volatilization flux through a soil cover was directly related to soil air-filled porosity and was greatly reduced by increased soil compaction and water content. An organic liquid phase associated with the hex waste was heavier than water and contained 1.4% HCB by weight. The presence of HCB in this liquid phase creates the potential for rapid transport of HCB in porous media. A procedure is proposed for using the results of this study to design a landfill cover that will limit the volatilization flux of HCB and other compounds.

PB80-217458 PC **A08**/MF **A01**
Purdue Univ., Lafayette, IN. Joint Highway Research Project.
Framework for the Transferability of Trip Generation Parameters for Small Urban Areas in Indiana.
Interim rept. no. 1,
Hani S. Mahmassani, and Kumares C. Sinha. 2 Aug 78, 165p JHRP-78-13, FHWA/ISHC/JHRP-78/13
See also PB80-217466 and PB80-217474. Sponsored in part by Indiana State Highway Commission, Indianapolis. Planning Study Title: Use of Synthetic Demand Modelling Techniques in Transportation Planning for Small Urban Areas in Indiana.

Initiating a continuing, comprehensive and coordinated transportation planning process is a considerable task that faces small metropolitan areas as their population reaches 50,000. These areas usually lack the technical know-how as well as the financial capabilities needed to use the battery of computer-oriented planning models more commonly used in larger metropolitan areas. In most cases, such sophistication is not needed because the problems faced by smaller areas are different in nature and in complexity from those in larger areas. This study examined the small and medium sized urban areas (population range: 50,000 to 250,000) of Indiana where full scale transportation studies have already been conducted, in an effort to make more efficient use of the information made available by these studies. This study focused on trip generation (frequency) models and parameters and examined the stability and transferability of these parameters between small and medium sized urban areas at three levels of aggregation: areawide, zonal and household levels. A framework was thus provided for the transferability of trip frequency parameters. Special emphasis was placed on trip generation by category analysis. Synthetic trip generation procedures aimed at eliminating the need for costly home interview O-D surveys were recommended. A methodology based on Bayesian statistics was suggested for updating cross-classified household trip generation rates.

PB80-217466 PC **A08**/MF **A01**
Purdue Univ., Lafayette, IN. Joint Highway Research Project.
Evaluation and Development of Synthetic Trip Distribution Modeling Techniques as Applied to Small Urban Areas.
Interim rept. no. 2,
James R. Mekemson, and K. C. Sinha. 11 Jul 79, 159p JHRP-79-5, FHWA/ISHC/JHRP-79/5
See also PB80-217474 and PB80-217458. Sponsored in part by Indiana State Highway Commission, Indianapolis. Planning Study Title: Use of Synthetic Demand Modelling Techniques in Transportation Planning for Small Urban Areas in Indiana.

As a part of a detailed study of synthetic travel demand modelling techniques that can be applied to small urban areas (population 50,000 to 250,000), this study concentrated solely on the trip distribution phase of the modelling process. The results of this research effort revealed the great variability that exists among the small urban areas. Due to this variability it was concluded that the most commonly suggested and used synthetic trip distribution modeling techniques of borrowing travel time impedance values (friction factors) from similar urban areas or the use of standardized calibration parameters cannot provide consistent and reliable results for all study areas. A trip distribution gravity model therefore was developed which possesses the capability to calibrate itself without the need for home interview survey data, while simultaneously retaining the accuracy of the traditionally calibrated model. The accuracy of the proposed procedure is due to its synthetic calibration at the origin zone level and its use of the origin zone opportunity travel time upon which the model is based. This methodology allows the calibration procedure of the model to be more responsive to the highway network and the spatial distribution of the land use activities.

PB80-217474 PC **A05**/MF **A01**
Purdue Univ., Lafayette, IN. Joint Highway Research Project.
The Effects of Simplifying Traffic-Zone and Street-Network Systems on the Accuracy of Traffic Assignments in Small Urban Areas in Indiana.
Interim rept. no. 3,
Edward W. Hanscom, and Kumares C. Sinha. 5 Sep 79, 85p JHRP-79-15, FHWA/IN/JHRP-79/15
See also PB80-217458 and PB80-217466. Sponsored in part by Indiana State Highway Commission, Indianapolis. Planning Study Title: Use of Synthetic Demand Modelling Techniques in Transportation Planning for Small Urban Areas in Indiana.

As a part of a detailed study of synthetic travel demand modelling techniques that can be applied to small urban areas (population 50,000 to 250,000), this study concentrated solely on the traffic assignment phase of the modelling process. The study considered the effects of the following factors on the accuracy of traffic assignment: number of traffic zones, use of census tracts as traffic zones, complexity of the network configuration and method of traffic assignment. Transportation network and travel data from two small Indiana urban areas, Lafayette and Anderson, were used. The results indicated that traffic zones, based upon census tract boundaries, and street networks with less detail, can be used without significant reduction in assignment accuracy. For the small urban areas considered in the study 90 internal zones can provide acceptable accuracy in traffic assignment.

PB80-218142 PC **A05**/MF **A01**
Post, Buckley, Schuh and Jernigan, Inc., Tampa, FL.
Suwannee County Industrial Park, Live Oak, Florida.
Final rept. Aug 77-Jan 79,
Jan 79, 100p CPRC/C-80/12
Contract CPRC-10740088
Prepared in cooperation with Suwanee County Development Authority.

The report represents the findings of a feasibility and preliminary site plan study for an industrial park in Live Oak, Florida. The industrial development potential is assessed and a concept site plan is prepared for a 50 acre tract and the market potential component includes an identification and evaluation of suitable industries. The site plan component provides a plan for the development of the site in a manner that meets the demand of previously identified industrial prospects and goals of the development authority.

PB80-219025 PC **A03**/MF **A01**
Virginia Highway and Transportation Research Council, Charlottesville.
Criteria for Preservation and Adaptive Use of Historic Highway Structures.
Interim rept.,
Howard Newlon, Jr. Jan 80, 47p VHTRC-78-R29

Metal truss bridges are uniquely indigenous products of American engineering and construction technology, and in recent years their historic significance has been increasingly recognized along with that of other early engineering structures. Some trusses that warrant inclusion on the National Register of Historic Places require renovation or replacement to meet modern traffic demands. Conflicting requirements of federal preservation and highway safety legislation demand that standards be developed to permit, early in the replacement planning process, objective identification of those trusses that warrant retention because of historic significance. Based upon a statewide survey of metal truss bridges in Virginia, an objective numerical rating system for historic significance has been developed that considers characteristics in three categories: documentation (age and builder), technology, and environmental factors. This system was applied to 58 bridges selected from approximately 500 surveyed statewide.

PB80-221591 PC **A11**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Livermore Regional Air Quality (LIRAQ) Model; Transfer to EPA.
Final rept.,
William H. Duewer, John J. Walton, Keith E. Grant, and Hoyt Walker. Aug 80, 230p EPA-600/4-80-041

Methods were developed to convert data from the Regional Air Pollution/Regional Air Monitoring Study (RAPS/RAMS) into a format compatible with the Livermore Regional Air Quality (LIRAQ) models. Changes made in the LIRAQ models include (1) improved map plotting routines, (2) updated chemical mechanism, and (3) a partial SO2 oxidation mechanism. Several appendices are intended to serve as a user's guide to the LIRAQ models and the associated data conversion routines.

PB80-221831 PC**$8.50**/MF **A01**
National Transportation Policy Study Commission, Washington, DC.
National Transportation Policies through the Year 2000.
Final rept.
Jun 79, 536p
Library of Congress catalog card no. 79-600020.

The report analyzes passenger and freight transportatin needs for both domestic and international markets. Based on these analyses, it makes far-reaching policy recommendations. The Commission believes that implementation of these policies will foster a healthy, responsive transportation system to serve the needs of the American people into the 21st century.

PB80-222839 PC **A02**/MF **A01**
California Univ., Davis. Water Resources Center.
An Empirical Assessment of Conjunctive Use and Water Pricing Policy.
Technical completion rept.,
B. Delworth Gardner, Richard E. Howitt, and Charles V. Moore. Aug 80, 16p W80-06556, OWRT-B-187-CAL(5)

Linear quadratic control models were utilized to analyze problems of conjunctive use of surface and groundwater in two California settings: (1) Yolo County, where a finite element hydrologic model was developed to provide physical data for an economic model, and (2) Kern County where groundwater overdrafting has been a long standing issue. The principal thrust of the Yolo study was to determine the economic efficiency of spatial surface and groundwater allocations and the efficiency of intertemporal groundwater decisions, given the common property problems arising from uncontrolled groundwater use. The Kern study had two primary thrusts: (1) to model groundwater demands and supplies and determine the optimal steady state depths of water tables in various areas and the factors influencing the optimal steady state, and (2) to model water quality linkages with quantity in order to derive implications for efficient water allocation, management, and control. Study results show clear evidence of significant resource misallocation of water both spatially and temporally.

PB80-223035 PC A04/MF A01
Virginia Water Resources Research Center, Blacksburg.
Enumeration and Inactivation of Enteric Viruses in Sludge,
Michael W. Nath, and James C. Johnson. Jul 80, 54p VPI-VWRRC-BULL-131, W80-06535, OWRT-A-086-VA(1)
Prepared in cooperation with Old Dominion Univ., Norfolk, VA. Dept. of Biological Sciences.

This study describes virus isolation methods and a new and efficient multiple extraction-concentration procedure for the enumeration of viruses in wastewater sludges. As an integral part of a comparison of isolation procedures, several anionic surfactants were examined for extraction of enteric viruses from primary wastewater sludges. Plaquing efficiencies for poliovirus-2 and coxsackievirus B-2 on several common cell lines were determined.

PB80-223662 PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Revision to State Implementation Plans - Procedures for Approval/Disapproval Actions.
Guideline series rept.
Sep 76, 45p OAQPS-1.2-005A

Regional EPA offices are delegated maximum responsibility allowed under the law to process rulemaking actions. Consequently, EPA headquarters review responsibilities will be reduced to be consistent with the increase in the Regional Office's responsibility in processing SIP rulemaking actions. However, despite increased Regional Office responsibility, EPA headquarters will retain the concurrence role in 'special action' cases. This document supersedes Interim Guideline OAQPS 1.2-005A (Revised) to implement this policy.

PB80-223670 PC A02/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Guidelines for the Interpretation of Air Quality Standards.
Guideline series rept. (Final).
Aug 74, 22p OAQPS-1.2-008F

This guideline document discusses a series of issues concerning the interpretation of air quality data as it relates to the National Ambient Air Quality Standards (NAAQS). The issues presented deal with points of interpretation that have frequently resulted in requests for further clarification. This document states each issue with a recommendation and a discussion indicating our current position. It is hoped that this document will serve as a useful step in the evolutionary development of a uniform and consistent set of criteria for relating ambient air quality data to the NAAQS.

PB80-223688 PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Guidance for Air Quality Monitoring Network Design and Instrument Siting. Supplement A. CO Siting.
Guideline series rept.
Sep 75, 44p OAQPS-1.2-012R1

The purpose of this supplement is to provide further assistance in resolving questions which commonly arise in the siting of CO monitors. The main body of the guideline document (OAQPS No. 1.2-012) contains summaries of the information provided in detail. This supplement represents the most current OAQPS position on the siting of CO instruments and supersedes all previous guidance material previously issued.

PB80-223696 PC A03/MFA01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Guidance for Air Quality Monitoring Network Design and Instrument Siting (Revised).
Guideline series rept.
Sep 75, 50p OAQPS-1.2-012R2

The purpose of this document is to provide the Regional Offices of the Environmental Protection Agency and the various State and local air pollution control agencies with guidance and assistance relating to the technical problems associated with the design of air quality monitoring networks and the selection of sites for instrument placement. It consolidates, updates, and expands the information contained in several previous documents. It does not deal specifically with the issues of quality assurance in the operation of air quality monitoring networks, although these issues are closely related to the current topic. Although the discussion in this document is concerned primarily with the six pollutants for which air quality standards have been set, and with associated meteorological monitoring, the principles on which it is based are equally applicable to monitoring programs directed at other pollutants.

PB80-223704 PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Procedures for Flow and Auditing of Air Quality Data.
Guideline series rept.
May 74, 45p OAQPS-1.2-013R

The purpose of this guideline is to provide the Regional Offices of EPA with guidance on data auditing techniques that should be followed as part of the procedure for inputting air quality data into the National Aerometric Data Bank. In conjunction with this Guideline, the MDAD is also developing sophisticated data edit, validation and quality control programs which should help smooth the transition between current and planned Regional Office air quality data responsibilities. This report will serve on an interim basis until more explicit and detailed guidance is developed.

PB80-223712 PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Guidelines for the Evaluation of Air Quality Trends.
Guideline series rept.
Feb 74, 33p OAQPS-1.2-014

The purpose of this guideline is to outline procedures that can be employed by the air pollution data analyst to evaluate trends in air quality. Trends will be generally considered as the broad long-term movement in the overall time sequence of historical air quality measurements. It will be examined in two ways. First will be in the form of a trend line or curve over time. Second will be a statistical categorization of the general direction of the movement over time, i.e., upward, downward, or no change. Associated with the second approach can be estimates of the rate of change of deterioration of improvement in the air quality. Most trend analysis can be performed upon aggregate measures of air quality estimates such as averages.

PB80-223720 PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Guidelines for the Evaluation of Air Quality Data.
Guideline series rept.
Feb 74, 37p OAQPS-1.2-015

The purpose of this guideline doucment is to present the basic elements of air quality data analysis that are essential in preparing reports describing the air quality status of a given region. With this aim in mind, emphasis has been placed upon describing both the conventions and the methodology to be employed with minimum discussion of the associated statistical theory. Much of the material that is presented has been treated before but for the sake of completeness, is reiterated in this document with appropriate references indicated.

PB80-223738 PC A06/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Control Strategy Preparation Manual for Photochemical Oxidant.
Guideline series rept.
Jan 77, 105p OAQPS-1.2-047

The Clean Air Act, as amended, provided that for each national ambient air quality standard (NAAQS) promulgated by the EPA, a State Implementation Plan (SIP) was to be developed which was to contain emission control measures that would provide for attainment and maintenance of such national standards, generally within three years of the approval of the SIP. This Control Strategy Preparation Manual for Photochemical Oxidant has been prepared to provide guidance to State and local control agencies on the development of an approvable control plan. The procedures outlined in this document should be followed by States, or EPA where necessary, in developing an approvable control strategy for photochemical oxidant. Section I provides an overview of the various factors to be considered in the development of an approvable control strategy for photochemical oxidant. Section II sets forth a fairly concise step-by-step procedure that a control strategy developer should follow in preparing an approvable control strategy. Section III provides, in question-and-answer format, additional information to provide a more detailed explanation of the recommended procedures outlined in Section II. Section IV includes additional information on existing inspection/maintenance programs.

PB80-223746 PC A08/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
SIP (State Implementation Plan) Preparation Manual for NOx.
Guideline series rept.
Aug 76, 171p OAQPS-1.2-048

The Clean Air Act, as amended in 1970, provided that for each national ambient air quality standard (NAAQS) promulgated by the Administrator, a State Implementation Plan (SIP) for each Air Quality Control Region (AQCR) was to be developed which was to contain emission control measures that would provide for attainment and maintenance of the SIP. It is now believed that continued growth of nitrogen oxide (NOx) emissions from mobile and stationary sources in a number of cases will make it difficult to maintain national standards in some areas where they are not presently being exceeded. Thus, additional NOx emission control measures may be necessary in some areas to assure attainment and maintenance of national standards. This SIP Preparation Manual for NOx has been prepared to provide guidance to EPA Regional Offices and State and local control agencies on the development of an approvable control strategy for nitrogen oxides.

PB80-223753 PC A02/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Regulatory and Technical Control Strageties for Fine Particles.
Guideline series rept.,
Joseph Padgett, and J. D. Bachmann. Jun 77, 17p OAQPS-1.2-076

This paper discusses the implications of available information for the development of technical and regulatory control strategies for fine particulate matter. Although it has been widely assumed to be a desirable goal, results of research activities in recent years have led to questions regarding the effectiveness and desirability of an undifferentiated fine particle standard. Control of specific categories of fine particles, with continued reliance on the current TSP, may be a more effective regulatory approach.

PB80-224041 PC A03/MF A01
Pacific Environmental Services, Inc., Santa Monica, CA.
Review of SO2 Control Alternatives for Colstrip Units No. 3 and No. 4,
J. C. Serne, and Norman A. Huey. Jan 78, 45p EPA-908/1-78-006
Contract EPA-68-01-4140

Montana Power Company is planning construction of two additional coal-fired electric generating units at its facility at Colstrip, Montana. Colstrip Units no. 3 and no. 4 will be equipped with scrub-

bers to remove particulates and sulfur dioxide, as required to meet New Source Performance Standards (NSPS) and Class I Prevention of Significant Deterioration (PSD) regulations. The objective of this study is to evaluate the SO2 control alternatives for Units no. 3 and no. 4. The design and performance of the scrubbers serving Units no. 1 and no. 2 are described. Sulfur dioxide emission rates from Units no. 3 and no. 4 are predicted, assuming a similar scrubber design and performance as reported for the existing units. Potential modifications to the planned scrubber design which might be expected to improve SO2 collection efficiencies are described. A brief summary of alternative SO2 control systems potentially available for Colstrip Units no. 3 and no. 4 is presented along with cost performance information and associated environmental and engineering sacrifices.

PB80-224710 PC **A11/MF A01**
California Univ., Los Angeles. School of Architecture and Urban Planning.
Efficiency and Equity Implications of Alternative Transit Fare Policies.
Final rept. Jul 79-Jun 80,
Robert B. Cervero, Martin Wachs, Renee Berlin, and Rex J. Gephart. Sep 80, 249p UMTA-CA-11-0019-80-1

The study explores efficiency and equity implications of flat fare systems using revenue, cost, trip making and demographic data from transit operators serving the Los Angeles, Oakland, and San Diego areas. Revenues paid by transit users for each mile of service are compared with the unit costs of their trips. The ratio of users' fares to costs per mile of travel are analyzed with respect to distance, time-of-day, and rider demographics in order to draw efficiency and equity inferences.

PB80-225113 PC **A04/MF A01**
Ford Motor Co., Dearborn, MI.
Electrolytic Treatment of Oily Wastewater from Manufacturing and Machining Plants.
Final rept.,
R. L. Gealer, A. Golovoy, and M. H. Weintraub. Jun 80, 59p EPA-600/2-80-143
Grant EPA-S-804174

A continuous electrolytic treatment is being developed to remove emulsified oil from dilute oily wastewater streams, such as is generated in metal working operations. In this process, the wastewater permeates through an iron chip bed anode and steel mesh cathode. A potential is applied to the electrodes, forming ferrous ions at the anode and hydroxyl ions at the cathode. The ferrous ions react in a complex manner with the emulsifying agents, destabilizing the emulsion and generating an oil rich floating sludge and essentially oil-free water. A pilot plant unit capable of processing about 5700 l/day (1500 gal/day) was designed, constructed, and evaluated at an actual plant site. Operating parameters and process equipment were evaluated to assess the potential and problems of the process. Wastewater with initial oil concentrations in the range of 300 to 7,000 ppm of solvent extractables has been reduced to less than 50 ppm in 90% of the test runs, and to less than 25 ppm in 38%.

PB80-225220 PC **A06/MF A01**
Colorado State Univ., Fort Collins. Dept. of Agricultrual Engineering.
Wind-Powered Aeration for Remote Locations.
Final rept. 15 Mar 75-31 Aug 76,
Paul M. Schierholz, Willis L. Somervell, Jr., William Babcock, Richard Hartel, and Keith Timbre. Oct 76, 153p NSF/RA-761859
Contract NSF-AER75-00833
Sponsored in part by Colorado Division of Wildlife, Fort Collins, CO. See also report dated Apr 76, PB-259 304.

The feasibility of using wind-powered aerators to prevent fish overkill during winter seasons is demonstrated. Ancillary studies include proper site selection, documentation of wind potential, and further development of wind-powered aerators. The aerators convert wind energy directly into compressed air which is then used in an aeration process. No auxiliary energy storage is required since the lake water acts as a storage device for the oxygen. Wind-powered aerators were installed and operated at three fish 'winterkill' lakes and at a sewage lagoon.

PB80-225717 PC **A05/MF A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
Industrial Process Profiles for Environmental Use: Chapter 28 Primary Zinc Industry.
Jul 80, 89p EPA-600/2-80-169
Contract EPA-68-03-2577

The primary zinc industry as defined for this study consists of mining, beneficiation, smelting, and refining. A profile of the industry is given including plant locations, capacities, and various statistics regarding production and consumption of zinc, coproducts, and by-products. The report summarizes the various commercial routes practiced domestically for zinc production in a series of process flow diagrams and detailed process descriptions. Each process description includes available data regarding input materials, operating conditions, energy and utility requirements, waste streams produced (air, water, and solid waste), and control technology practices and problems.

PB80-225931 PC **A03/MF A01**
Transport and Road Research Lab., Crowthorne (England).
The Effect of Travel Costs on the Design of Highway Alignments,
J. Broughton. c1979, 28p TRRL-LR-912

The alignment chosen for a new road will affect the travel costs of all drivers using it. In current practice, travel costs are taken into account when making an economic evaluation of a new road but are often not included explicitly when designing the alignment of the road. This inconsistency may lead to the construction of a new road to a design which does not represent the best balance between the costs of travel and of construction. In this report a simple method is described for allowing the expected travel costs of a new road to influence the design of the alignment. The conversion of an existing vertical alignment optimization computer program to take account of travel costs is described. The new program has been applied to a current highway scheme with a vertical alignment that had been optimized to minimize the scheme's construction cost. The highway considered passes through hill terrain, and it is shown that an improvement in the economic value of the scheme can be achieved by introducing travel costs into the design process. (Copyright (c) Crown Copyright 1979.)

PB80-225956 PC **A03/MF A01**
Transport and Road Research Lab., Crowthorne (England).
Temperatures in Bridges During the Cold Winter of 1978/1979,
Mary Emerson. c1980, 36p TRRL-LR-926

The cold winter of 1978/1979 provided an opportunity for comparing effective bridge temperatures and temperature differences measured during these severe conditions with those predicted using methods developed at TRRL. The month of January 1979 contained the lowest temperatures, and both the effecive temperatures of the Marlow-Bisham bridge (concrete box) and the temperature differences measured through the depth of its deck during this month are presented in the Report and compared with predictions. Temperatures were also measured in the three elevated concrete slabs and two steel plates situated within the TRRL grounds. The levels of temperature reached during January 1979 are some of the lowest recorded at this site since measurements started there in 1970. Because of the sizes of the slabs and plates and their proximity to the ground, their temperatures are not strictly representative of bridge temperatures, but they provide useful supplementary information on the thermal behavior of exposed concrete and steel. (Copyright (c) Crown Copyright 1980.)

PB80-226533 PC **A03/MF A01**
Transport and Road Research Lab., Crowthorne (England).
The Use of Local Bus Service,
C. G. B. Mitchell. c1980, 35p TRRL-LR-923

Patronage of local bus services has been falling since at least 1952. This report uses the National Travel Surveys of 1965, 1972/73 and 1975/76 to examine how the use of local bus services has changed since 1965. A declining proportion of bus trips are made to and from work, and an increasing proportion for shopping. Characteristics of bus users with respect to age, sex, area of residence, car ownership, income and the socio-economic group of the user's household are studied. Variation of bus use with time of day and with season is shown. It is found that demand for bus travel by adults has become less peaked, and that by 1975/76 most of the additional peak demand was due to children. (Copyright (c) Crown Copyright 1980.)

PB80-226582 PC **A03/MF A01**
Transport and Road Research Lab., Crowthorne (England).
Performance of Sections of the Nairobi to Mombasa Road in Kenya,
H. R. Smith, T. E. Jones, and C. R. Jones. c1980, 45p TRRL-LR-886
Also pub. as ISSN-0305-1293.

Details are given of the performance of sections of the Nairobi-Mombasa road in Kenya. Nine sections of road with cement-stabilized bases, surfaced with multiple seals, and three sectons with crushed rock bases and asphaltic concrete surfacings have been studied for seven years. These road sections are located in a dry area, on strong subgrade soils. For both types of pavement, deterioration has been mainly confined to the surfacings, and timely resealing has a powerful effect in limiting the amount of patching required and in maintaining an acceptable level of surface roughness. The lives of the better quality seals have been of the order of four to five years. Deflection measurements clearly show how variations in overall pavement strength are affected by changes in annual rainfall, and the wide variation in strength which can occur on a nominally uniform pavement. Deflection measurements did not give early warning of pavement surfacing failures. (Copyright (c) Crown Copyright 1980.)

PB80-226608 PC **A03/MF A01**
Transport and Road Research Lab., Crowthorne (England).
Road Surface Irregularity and Vehicle Ride. Part 3: Riding Comfort in Coaches and Heavy Goods Vehicles,
D. R. C. Cooper, M. Phil, and J. C. Young. c1980, 34p TRRL-SUPPLEMENTARY-560
See also Part 2, PB-300 412.

An investigation is described of the riding comfort in long-distance coaches and heavy goods vehicles, operating over typical trunk road surfaces. Ride, represented by the root-mean-square(rms) of the vertical acceleration at the seat-person interface, has been measured in both coaches and lorries and correlated with riding comfort assessments of drivers and passengers. Comparisons are made with the ride in cars measured in previous experiments. Results show that coach passengers and lorry drivers will tolerate higher acceleration levels more readily than will car occupants. Psychological factors, as well as vibration levels influence the subjective assessment of ride. Evaluation of the highest measured acceleration levels against recommended International Standards of human response to whole-body vibration show a possibility that lorry drivers could, in certain cases, suffer some fatigue-decreased proficiency within their present legally permitted periods of continuous driving. The ride in lorries could be improved by the more widespread use of suspension seats. (Copyright (c) Crown Copyright 1980.)

PB80-226954 PC **A04/MF A01**
Massachusetts Inst. of Tech., Cambridge. Center for Transportation Studies.
An Examination of the Transit Funding Process at the Local Level.
Final rept. Sep 77-May 79,
James P. Womack, and Alan A. Altshuler. May 79, 70p UMTA-MA-11-0030-80-1

The study examines the transit funding process at the local level during the period of public ownership. In particular, the study focuses on what the recent injection of public funds has bought and on those features of the local decision making process which have led to the particular uses chosen for the funds. The study is organized around five types of decisions which encompass the key choices made in most localities since the time of public takeover. These are: (1) the decision to

assume public operation and subsidization of the transit system; (2) decisions about the uses of federal capital assistance grants; (3) decisions about the use of formula funds from higher levels of government for capital and operating assistance; (4) decisions about the appropriate response to growing demands for attention to the special transportation needs of the elderly and handicapped; and 5) decisions about the appropriate response to the growing fiscal austerity of the late 1970s. The study findings are based on case studies in nine metropolitan areas. The study cities were selected to include a wide range of sizes, population densities and growth rates, mode splits for the journey to work, durations of transit deficits, and local government expenditures per capita.

PB80-226988 PC **A05**/MF **A01**
Oklahoma Univ., Norman. School of Civil Engineering and Environmental Science.
Paratransit Case Studies: Overview.
Research summary rept.,
Allen R. Cook, and Charles E. Barb, Jr. Nov 79, 97p UMTA-OK-11-0001-80-1
Contract DOT-OK-11-0001
See also report dated Jul 79, PB80-103237.

The report is one element of a set of curriculum materials to support university class and professional short course training in local paratransit planning. In an attempt to capture some of the diverse elements of paratransit and move toward a synthesis of paratransit development, the authors have developed five case studies of local paratransit organizations which have successfully implemented paratransit services. They encompass a broad range of modes, market applications, and institutional structures. Each case study was developed around a common analysis framework, and all facets to service development were investigated. The purpose of this overview is principally to introduce the analysis framework for these case studies and provide pertinent historical background information. It also summarizes the case study experiences, and comments on technology transfer in paratransit service development. In addition, the case study experiences are compared with national statistics and experiences.

PB80-227002 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Rural Transport Experiments: The Taw Valley Car Service.
c1980, 41p TRRL-SUPPLEMENTARY-570

The Taw Valley Car Service was a commercially operated shared hire car scheme designed to fill gaps within an exisiting public transport network. It offered residents an improved choice of destinations and of days of travel by making feeder connections with existing services, and it offered a local facility. The area was large, and was divided into separate operating zones. Operators were found to be in limited supply, and the scheme was not established in the whole of the designated area. The service operated reliably, but patronage was low. Lifts and direct conventional buses catered for most requirements at the site, leaving only residual scattered demands. Many of the car journeys were for important purposes, such as medical appointments, but most trips would have been made somehow in the absence of the service, and only about one-fifth of trips resulted in an extra bus or train journey. The low demand resulted in little car sharing, poor vehicle utilization, and consequently poor financial performance. During the second phase of the scheme direct revenue covered 13 per cent of total costs, with indirect generated revenue on other services equivalent to roughly a further 6 per cent of costs. (Copyright (c) Crown Copyright 1980.)

PB80-227010 PC **A04**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Design of Traffic Management Schemes,
D. R. Leonard. c1980, 58p TRRL-SUPPLEMENTARY-568

A two-day seminar was held in May 1978 at TRL to consider the contribution that research can make to the design of effective traffic management schemes. Its principal aim was to provide an opportunity for research workers, consultants and practicing traffic engineers to exchange ideas and information on practical and theoretical aspects, and to ensure that research programs and current requirements and activities are closely related. It was not intended to provide advice and rules for the design and implementation of traffic management schemes. It was organized in four sessions. The first was concerned with the role of traffic management, its objective and methods, and its acheivements and failures. The second session concentrated on research into methods for predicting traffic patterns resulting from traffic management measures. The third and fourth sessions considered practical applications and their assessment, and included a paper on the contributions that further developments in electronic equipment could make to the control of traffic. This report contains digests of the papers presented at the seminar, summaries of the discussions and comments at each session, and an overall summary by the Chairman. (Copyright (c) Crown Copyright 1980.)

PB80-227119 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Kielder Trial Tunnel: Sprayed Concrete Extension.
Current papers,
W. H. Ward, and D. L. Hills. c1978, 15p CP-73/78

During 1977, the mudstone heading of the Kielder Experimental Tunnel was extended some 30 m by blasting in successive pulls about 2 m long. Each pull was supported by a complete ring of sprayed concrete applied at different times after blasting. This paper describes the construction, the concrete spraying operation, the timings of critical construction operations, the measurement of rock displacements and strains in the concrete supports, and a simple penetrometer to assess the rate of concrete stiffening. (Copyright (c) British Crown Copyright.)

PB80-227176 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
Studies of Fire and Smoke Behaviour Relevant to Tunnels.
Current papers,
A. J. M. Heselden. c1978, 22p CP-66/78

Experimental and theoretical work relating to the tunnel fire situation is discussed. This includes general studies of burning, flame height, and influence of ceilings on flames, air entrained into flames and rising plumes, the smoke production of fires and the movement of smoke in tunnels and corridors. The possibilities of limiting smoke spread by controlling ventilation are also discussed. (Copyright (c) British Crown Copyright.)

PB80-227317 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Relationship between Road Lighting Quality and Accident Frequency,
P. P. Scott. c1980, 24p TRRL-LR-929
Also pub. as ISSN-0305-1293.

Many studies have related changes in accident frequency to the presence of street lighting, and a few have examined its variation over a range of lighting quality, as measured by illuminance. This investigation attempts to find which of several measures of lighting (describing quantity - as represented by luminance or illuminance - uniformity and glare) most clearly explain variations in accident frequency. (Copyright (c) Crown Copyright 1980.)

PB80-227325 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
A Comparison of Optimal Minibus, Dial-a-Bus and Conventional Bus Services,
R. J. Tunbridge. c1980, 18p TRRL-LR-928
Also pub. as ISSN-0305-1293.

An assessment has been made of the comparative performance of minibus, dial-a-bus and conventional bus services when operated at their optimal fare and frequency and in the absence of competing stage carriage services. This was effected using previously developed computer models. The three types of service were assessed individually over the same off-peak operating hours at frequencies from two to six buses an hour and the performances of the services at their profit maximizing and net benefit maximizing fares were examined. It was concluded that, when operated at the same frequency all three services were equally attractive to passengers. The dial-a-bus service was however, found to be less efficient and more expensive to operate. None of the services could be operated at a net profit, although the conventional bus approximately covered its costs at a frequency of two buses an hour while generating a positive net social benefit. Comparison with an earlier study, where all services were constrained to operate at the same fare and in the presence of competing stage carriage services showed that the relative performance and efficiency of the optimal services were unchanged; the optimal services however, performed better from both financial and social points of view than those to which the constraints applied. (Copyright (c) Crown Copyright 1980.)

PB80-227341 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Measurement of Pavement Deflections in Tropical and Sub-Tropical Climates,
H. R. Smith, and C. R. Jones. c1980, 29p TRRL-LR-935
Also pub. as ISSN-0305-1293.

The measurement of the deflection of the surface of road pavements under a standard wheel load is common practice in many countries. The main purpose of making deflection measurements are to assist in the evaluation of the structural condition of roads, and to help in the design of road strengthening measures. In developing countries in the tropics the high road temperatures and other climatic effects necessitate the use of a special technique in making deflection tests. This report describes the techniques adopted by the Overseas Unit of the Transport and Road Research Laboratory for the measurement of pavement deflection in tropical developing countries, and discusses factors relevant to the deflection of road pavements in such conditions. (Copyright (c) Crown Copyright 1980.)

PB80-227358 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
MIDAS: A Computer Program to Estimate Delays at Junctions,
I. J. Burrow. c1980, 49p TRRL-LR-939
Also pub. as ISSN-0305-1293.

The assessment of delays is an important step in deciding which type of junction is the most suitable for handling a given traffic problem. A computer program, MIDAS: Method for Intersection Delay Assessment, has been written to predict delays at junctions. A wide range of junction types from small major/minor junctions and mini-roundabouts to large free-flow interchanges are covered. The program incorporates capacity and delay formulae recently developed at TRRL. Account may be taken of seasonal and hourly variation in flow level and also of the effect of tidal flows during the peak. The program calculates both the traffic dependent queueing delay and also the geometric delay. The output includes details of the performance of the junction as the flow varies through the year, and problems with particular traffic streams may be identified.

PB80-227366 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
ARCADY: A Computer Program to Model Capacities, Queues and Delays at Roundabouts,
Erica M. Hollis, Marie C. Semmens, and Sharon L. Denniss. c1980, 40p TRRL-LR-940
Also pub. as ISSN-0305-1293.

A computer program to model capacities, queues and delays at roundabouts is described. It incorporates the latest roundabout entry capacity formula and time-dependent queueing equations. The basic inputs are certain geometric characteristics of the roundabout, the turning proportions of the traffic, the percentage of heavy vehicles in the traffic and a time 'profile' of demand flows (or less de-

tailed demand flow information from which the program synthesises a profile). The program calculates, for each of a succession of time intervals, the capacity, queue length and delay for each entry and enables the growth and decay of queues to be monitored and the calculation of overall delay. A full example is included.

PB80-227374 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Traffic Capacity of Roundabouts,
R. M. Kimber. c1980, 49p TRRL-LR-942
Also pub. as ISSN-0305-1293.

A study has been made of the entry of conventional and offside priority roundabouts at eighty-six public road sites, and a unified formula for capacity prediction developed. The traffic flow entering a roundabout from a saturated approach was found to be linearly dependent on the circulating flow crossing the entry. The most important factors influencing the capacity are the entry width and flare. The entry angle and radius have small but significant effects. The inscribed circle diameter, used as a simple measure of overall size, is more effective as a predictive variable for the capacity than the category distinction between conventional and offside priority roundabouts, and for capacity prediction there is no need to retain this distinction. In addition to normal capacity prediction, methods have been developed which allow: (1) the predictive equation to be corrected to take account of local operating conditions at overloaded existing sites; and (2) the equation to be used specifically to predict the effects of changes in the entry geometry of existing sites.

PB80-227390 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Future for Treatment of Domestic and Commercial Wastes at Source.
Current papers,
D. E. Sexton. c1977, 12p CP-5/77
Paper presented at the Economic Commission for Europe, Seminar on the Collection, Disposal, Treatment and Recycling of Solid Wastes Held in Hamburg, Federal Rupublic of Germany, on 1-6 September 1975.

Increasing outputs of refuse from domestic and commercial buildings have led to problems with storage prior to removal by the collection authorities. On-site treatment plant which has been developed to reduce the volume of stored refuse is reviewed and methods of preparing refuse for collection and transport by pipeline systems are discussed in this pamphlet. The potential of hydraulic and pneumatic pipelines and use of the existing sewerage system for refuse transport are considered. (Copyright (c) British Crown Copyright.)

PB80-227416 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Some Examples of the Influence of Field Measurements on Foundation Design and Construction.
Current papers,
J. B. Burland. c1977, 20p CP-11/77

This pamphlet describes a variety of instruments and their use in observing the movement of the ground beneath and around foundations. The instruments include precision surveying equipment, inclinometers and borehole extensometers. A number of case histories are presented in which the results of field measurements have made a significant contribution to the understanding of the behaviour of the ground and its interaction with the structure. The examples have been selected from studies carried out by the Building Research Station and include designing for mining subsidence, the founding properties of chalk, foundations on stiff clays and the behaviour and design of deep basement excavations. The examples serve to illustrate the vital role that field measurements play in developing experience and understanding of foundation design and performance. (Copyright (c) British Crown Copyright.)

PB80-227432 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Sprayed Concrete: Tunnel Support Requirements and the Dry Mix Process.
Current papers,
W. H. Ward, and D. L. Hills. c1977, 29p CP-18/77

The particular structural requirements of sprayed concrete acting as an arch or a ring to support a Carboniferous shale in the Kielder Water Scheme experimental tunnel are described in the light of detailed performance studies of several support systems over a period of two years. The rate at which the concrete stiffens needs to be optimized for economy and safety in relation to the timing and position of constructional operations and their influence on the dilation of the rock, particularly in small tunnels. The inherent characteristics of the dry-mix spraying process, all of which effect the quality of the concrete, are presented from the results of laboratory and field trials. (Copyright (c) British Crown Copyright.)

PB80-227465 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
Guide to the Use of Portable Flammable Gas Detectors.
Current papers.
c1977, 12p CP-33/77

This guide on the use of portable flammable gas detectors is intended particularly for those concerned with estimating flammable gas or vapor concentrations, (managers, engineers, Fire Service, etc.) either on a regular basis or in emergencies. Its aim is to provide a broad background to the use and limitations of portable gas detectors. It in no way seeks to replace existing documentation either from the instrument manufacturers or from regulatory authorities. (Copyright (c) British Crown Copyright.)

PB80-227549 CP **T11**
Environmental Sciences Research Lab., Research Triangle Park, NC. Meteorology and Assessment Div.
PAL, HIWAY-2, TEM8, MESO Models.
Model-Simulation,
D. Bruce Turner, William B. Petersen, and Adrian D. Busse. 17 Jul 80, mag tape EPA/DF-80/007
Source tape is in ASCII character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions. Price includes documentation, PB80-227556, PB80-227564, PB80-227572, PB80-227580, PB80-227598, PB80-227796, PB80-227804, PB80-227812, and PB80-228042.

This NTIS tape contains 9 files. The following atmospheric dispersion models are made available on this tape. (1) PAL version 80080 is an update of version 78310. PAL is a method of estimating short-term dispersion using Gaussian-Plume steady-state assumptions for Point, Areas, and Line Sources. (2) HIWAY-2 version 80080 is an update to the HIWAY model. This steady-state Gaussian model can be applied to determine air pollution concentrations downwind of 'at-grade' and 'cut-section' highways. (3) TEM8 is a Fortran program designed to predict ground level, short-term concentrations of atmospheric pollutants from point and area sources. (4-6) MESOPLUME, MESOPUFF, and MESOGRID are three variable-trajectory regional-scale atmospheric dispersion models. They are designed to simulate the air quality impacts of multiple point sources at long transport distances. MESOPLUME and MESOPUFF are Gaussian dispersion models while MESOGRID is a grid model, based on the Egan-Mahoney method of moments. T he three remaining files are: MESOPAC, a meteorological preprocessor program. MESOFILE, a postprocessing system designed for file management, file merging, file manipulations, statistical analyses, and graphical display. MESOTEST, an example data base for the MESOPLUME, MESOPUFF and MESOGRID dispersion models...Software Description: The system is written in the Fortran programming language for implementation on an UNIVAC computer using the 33R operating system. 7K bytes of core storage for HIWAY-2, 92K for MESOGRID are required to operate the system.

PB80-227556 PC **A05**/MF **A01**
Environmental Sciences Research Lab., Research Triangle Park, NC. Meteorology and Assessment Div.
User's Guide for HIWAY-2. A Highway Air Pollution Model,
Willian B. Petersen. May 80, 84p EPA-600/8-80-018, EPA/DF-80/007A
For system on magnetic tape, see PB80-227549.
See also report dated Feb 75, PB-239 944.

A computer model, called HIWAY-2, can be used to estimate the concentrations of nonreactive pollutants from highway traffic. This steady-state Gaussian model can be applied to determine air pollution concentrations at receptor locations downwind of 'at-grade' and 'cut section' highways located in relatively uncomplicated terrain. With the exception of receptors directly on the highway or within the cut, the model is applicable for any wind direction, highway orientation, and receptor location. The model was developed for situations where horizontal wind flow occurs. The model cannot consider complex terrain or large obstructions to the flow such as buildings or large tress.

PB80-227564 PC **A08**/MF **A01**
Environmental Sciences Research Lab., Research Triangle Park, NC. Meteorology and Assessment Div.
User's Guide for PAL. A Gaussian-Plume Algorithm for Point, Area, and Line Sources,
William B. Petersen. Feb 78, 167p EPA-600/4-78-013, EPA/DF-80/007B
For system on magnetic tape, see PB80-227549.

PAL is a method of estimating short-term dispersion using Gaussian-plume steady-state assumptions. The algorithm can be used for estimating concentrations of non-reactive pollutants at 99 receptors for averaging times of from 1 to 24 hours, and for a limited number of point, area, and line sources (99 of each type). This algorithm is not intended for application to entire urban areas but is intended, rather, to assess the impact on air quality, on scales of tens to hundreds of meters, of portions of urban areas such as shopping centers, large parking areas, and airports. Level terrain is assumed.

PB80-227572 PC **A10**/MF **A01**
Texas Air Control Board, Austin.
Texas Episodic Model, User's Guide.
Final rept.
Oct 79, 224p EPA/DF-80/007C
For system on magnetic tape, see PB80-227549.

The Texas Episodic Model Version 8 (TEM8) is a Fortran computer program designed to predict ground level, short-term concentrations of atmospheric pollutants. This model uses a technique, first introduced in the Texas Climatological Model, that requires much less computer time than most short-term models. Predictions are based upon the steady-state Gaussian plume hypothesis, Briggs plume rise formulations, and Pasquill-Guifford dispersion coefficient approximations. The TEM8 is a general purpose model that has many applications. Ground level concentrations for one or two pollutants can be determined for time periods from 10 minutes to 24 hours. TEM8 maintains the assumption that the mass of the plume cross section is conserved for all averaging times. Up to 300 individual point sources and up to 50 area sources may be input to the model.

PB80-227580 PC **A10**/MF **A01**
Environmental Research and Technology, Inc., Concord, MA.
Development of Mesoscale Air Quality Simulation Models. Volume 1. Comparative Sensitivity Studies of PUFF, PLUME, and GRID Models for Long Distance Dispersion.
Final rept.,
Arthur Bass, Carl W. Benkley, Joseph S. Scire, and Charles S. Morris. Sep 79, 221p EPA-600/7-80-056, EPA/DF-80/007D
Contract NOAA-03-6-02-35[illegible]54
For system on magnetic tape, see PB80-227549.Color illustrations reproduced in black and white.

This report provides detailed comparisons and sensitivity analyses of three candidate models, MESOPLUME, MESOPUFF, and MESOGRID. This was not a validation study; there was no suitable regional air quality data base for the Four Corners area. Rather, the models have been evaluated by analyzing: model response to varying me-

oscale flow regimes, model sensitivity to systematic variations in meteorological and model design parameters; and model accuracy versus computational requirements and costs.

PB80-227598 PC **A07**/MF **A01**
Environmental Research and Technology, Inc., Concord, MA.
Development of Mesoscale Air Quality Simulation Models. Volume 2. User's Guide to MESOPLUME (Mesoscale Plume Segment) Model.
Final rept.,
Arthur Bass, Carl W. Benkley, Joseph S. Scire, and Charles S. Morris. Sep 79, 141p EPA-600/7-80-057, EPA/DF-80/007E
Contract NOAA-03-6-02-35254
For system on magnetic tape, see PB80-227549.

Highly user-oriented, MESOPLUME provides a range of flexible options, and its clean, modular structure permits further modifications with ease. It is designed to be driven by user-specified meteorological scenarios, of arbitrary duration, constructed by a suitable meteorological preprocessor model (e.g., MESOPAC). It outputs spatially-gridded concentration arrays averaged over arbitrary time intervals of one hour or more and is designed to be coupled to a postprocessor model (e.g., MESOFILE) to provide additional graphical and statistical analyses. Routines are provided for: plume rise; plume growth; fumigation; linear conversion of SO2 to SO4; and dry deposition of SO2 and SO4.

PB80-227721 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
A Survey of Recreational Traffic in the Yorkshire Dales,
P. A. K. Greening, and P. G. Smith. c1980, 30p
TRRL-SUPPLEMENTARY-539

In 1975 TRRL conducted a roadside interview survey of recreational traffic in the Yorkshire Dales National Park. A route mapping technique was used to record details of the journey, and stops within the Park. Data from the survey were used to develop diagrams showing the distribution of traffic flows in the Dales on the survey days. The distribution and duration of stops and trip length between stops are also discussed. The trip origin data were used to derive equations relating trip rate per 1000 car-owning households in the origin zone with distance, travel time and generalized cost. (Copyright (c) Crown Copyright 1980)

PB80-227796 PC **A06**/MF **A01**
Environmental Research and Technology, Inc., Concord, MA.
Development of Mesoscale Air Quality Simulation Models. Volume 3. User's Guide to MESOPUFF (Mesoscale Puff) Model.
Final rept.,
Arthur Bass, Carl W. Benkley, Joseph S. Scire, and Charles S. Morris. Sep 79, 122p EPA-600/7-80-058, EPA/DF-80/007F
Contract NOAA-03-6-02-35254
For system on magnetic tape, see PB80-227549.

MESOPUFF is a variable-trajectory regional-scale Gaussian puff model especially designed to simulate the air quality impacts of multiple point sources at long transport distances. Highly user-oriented, MESOPUFF provides a range of flexible options, and its clean, modular structure permits further modifications with ease. It is designed to be driven by user-specified meteorological scenarios, of arbitrary duration, constructed by a suitable meteorological preprocessor model (e.g., MESOPAC). It outputs spatially-gridded concentration arrays averaged over arbitrary time intervals of one hour or more and is designed to be coupled to a postprocessor model (e.g., MESOFILE) to provide additional graphical and statistical analyses. Routines are provided for: plume rise; plume growth; fumigation; linear conversion of SO2 to SO4; and dry deposition of SO2 and SO4.

PB80-227804 PC **A06**/MF **A01**
Environmental Research and Technology, Inc., Concord, MA.
Development of Mesoscale Air Quality Simulation Models. Volume 4. User's Guide to MESOGRID (Mesoscale Grid) Model.
Final rept.,
Arthur Bass, Carl W. Benkley, Joseph S. Scire, and Charles S. Morris. Sep 79, 107p EPA-600/7-80-059, EPA/DF-80/007G
Contract NOAA-03-6-02-35254
For system on magnetic tape, see PB80-227549.

MESOGRID is a regional-scale grid model, based on the Egan-Mahoney method of moments, especially designed to simulate the air quality impacts of multiple sources at long transport distances. Highly user-oriented, MESOGRID provides a range of flexible options, and its clean, modular structure permits further modifications with ease. It is designed to be driven by user-specified meteorological scenarios, of arbitrary duration, constructed by a suitable meteorological preprocessor model (e.g., MESOPAC). It outputs spatially-gridded concentration arrays averaged over arbitrary time intervals of one hour or more, and is designed to be coupled to a postprocessor model (e.g., MESOFILE) to provide additional graphical and statistical analyses. Routines are provided for: plume rise; fumigation; linear conversion of SO2 to SO4; and dry deposition of SO2 and SO4.

PB80-227812 PC **A04**/MF **A01**
Environmental Research and Technology, Inc., Concord, MA.
Development of Mesoscale Air Quality Simulation Models. Volume 5. User's Guide to the MESOFILE Postprocessing Package.
Final rept.,
Arthur Bass, Carl W. Benkley, Joseph S. Scire, Charles S. Morris, and John E. Beebe. Sep 79, 65p EPA-600/7-80-060, EPA/DF-80/007H
Contract NOAA-03-6-02-35254
For system on magnetic tape, see PB80-227549.

The MESOscale FILE management and analysis package (MESOFILE) is a highly flexible postprocessing system designed especially for interface with the MESOPLUME, MESOPUFF, and MESOGRID regional-scale air quality models, and the MESOPAC meteorology package. The MESOFILE package is composed of five distinct program modules consisting of file management, file merging, file manipulation, statistical analysis, and graphical display. The file management system automatically catalogues input parameter values and output file locations of all regional-scale model simulations; any set of regional-scale model output can, therefore, be easily accessed for postanalysis. Postprocessing capabilities include multiple file averaging, multiple file addition, point-by-point and bulk statistical comparison of two files, contour plots of concentration and most meteorological fields, and vector plots of wind fields.

PB80-227945 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Known Risks We Run: The Highway,
Barbara E. Sabey, and H. Taylor. c1980, 29p
TRRL-SUPPLEMENTARY-567
Paper presented to the Symposium 'Societal Risk Assessment: How Safe Is Safe Enough' Held at General Motors, Warren, Michigan, October 1979.

The paper reviews known risks on the highway in perspective with the options available for reduction of risk, illustrating principles from experience in Great Britain. Firstly, the overall risks of accident and injury on the highway are enumerated statistically in relation to the individual and to the Community. The subjective view of these risks is discussed in terms of public response to different situations and monetary values ascribed. A relatively objective assessment of risks associated with different factors has been obtained through a multidisciplinary study of the contribution of aspects of highway design, vehicle condition, and road user behaviour to accident occurrence. Stress is laid on interactions between the road, the vehicle, and the road user. Other studies give quantification of risks for specific road engineering and environmental factors, and show how probability of injury may be related to vehicle design. The potential for reduction in accident or injury risk is examined in the light of known benefits from well tried countermeasures, and quantified in relation to road engineering and traffic management, vehicle design and use road user behaviour and road usage. Finally, risk factors are contrasted with remedial potential. Future directions for application of countermeasures to reduce risk and for research to enhance quantification of risk and identify new effective countermeasures are enumerated. (Copyright (c) Crown Copyright 1980.)

PB80-227952 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Roundabout Capacity: Public Road Experiment at Wincheap, Canterbury,
Marie C. Semmens, P. J. Fairweather, and I. B. Harrison. c1980, 25p TRRL-SUPPLEMENTARY-554

A public road experiment at the '4-arm' junction A2/A28 (Wincheap Roundabout, Canterbury) has been carried out to compare the capacities of two alternative offside priority roundabout designs. As expected, higher capacities were obtained with the design having wider entries combined with a reduced island size. Closing one arm of the roundabout had only a small (and not statistically significant) effect on the full capacity. Possible effects on the individual entry capacities of the number of entries queueing and of the flow leaving the roundabout by the previous exit were investigated; neither effect was found to be significant. Entry capacity relationships obtained from the data by linear regression were used to test a roundabout capacity balancing computer program by comparing the predicted operating capacities with those observed. The results showed close agreement. (Copyright (c) Crown Copyright 1980.)

PB80-227960 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Accident Investigation Techniques for Assessing Vehicle Safety Features,
Barbara E. Sabey. c1980, 15p TRRL-SUPPLEMENTARY-551
Paper presented to the International Technical Conference on Experimental Vehicle Safety (7th), Held at Paris, France, June 1979.

The paper describes recent progress in the UK towards developing a multi-level system of accident investigation specifically related to vehicle secondary safety. The application of the national police statistics to determine priorities, the extension of local in-depth investigations for furthering the understanding of injury mechanism, and proposals for an intermediate level system for monitoring changes in vehicle safety features on a sample basis are outlined. The Co-ordination of activities between 3 teams involved in studying injury causation and alleviation (at the Transport and Road Research Laboratory, Birmingham Accident Research Unit, and Oxford Road Accident Group) is an important part of the work. A procedure is being developed for harmonizing accident investigaton techniques - for the study of biomechanics of injury for car occupants in particular - while enabling the teams to retain their own specific objectives and local interests. The current three year programme (1978-1981) of research studies is summarized. (Copyright (c) Crown Copyright 1980.)

PB80-227978 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Pull-Out Tests on Reinforcements Embedded in Uniformly Graded Sand Subject to Vibration,
R. T. Murray, D. R. Carder, and J. V. Krawczyk. c1980, 21p TRRL-SUPPLEMENTARY-583
Paper presented to the European Conference on Soil Mechanics and Foundation Engineering (7th), Held at Brighton, 1979.

The results are presented of pull-out tests on both metal and fiber reinforced plastic reinforcements installed in an experimental reinforced earth wall constructed with uniformly graded sand. To assess whether surface vibrations such as those produced by traffic could influence the behaviour of reinforced earth structures tests were carried out under both static and dynamic loading conditions. The apparent angle of friction between soil and reinforcement was always greater than that measured in direct shear tests. This effect was attributed to dilatancy of the soil around the reinforcements and any undulations induced in the reinforcements at their installation. Consequently pull-out test results should not be used directly for design purposes without interpretation. (Copyright (c) Crown Copyright 1980.)

PB80-228042 PC A04/MF A01
Environmental Research and Technology, Inc., Concord, MA.
Development of Mesoscale Air Quality Simulation Models. Volume 6. User's Guide to MESOPAC (Mesoscale Meteorology Package).
Final rept.,
Arthur Bass, Carl W. Benkley, Joseph S. Scire, and Charles S. Morris. Sep 79, 73p EPA-600/7-80-061, EPA/DF-80/007I
Contract NOAA-03-6-02-35254
For system on magnetic tape, see PB80-227549.

MESOPAC is a mesoscale meteorological preprocessor program; it is designed to provide meteorological data to regional-scale air quality simulation models. Radiosonde data routinely available from National Weather Service (IWS) radiosonde ('upper air') and surface stations are used to produce spatially-interpolated, time-sequenced mesoscale meteorological data fields. These include: (a) horizontal (u,v) wind components; (b) mixing depth; (c) Pasquill-Gifford-Turner (PGT) stability class. An interpolation/iterative relaxation scheme is used to construct the wind field. The mixing depth and PGT stability fields are created with a new physically appealing algorithm. MESOPAC is a fully-independent program, easily coupled to any reasonably modular transport-diffusion model. Currently, it is used to drive the MESOPUFF, MESOPLUME, and MESOGRID models. MESOPAC is highly user-oriented: easy to understand; easy to use; easy to modify. It offers a range of features including: user-specified grid resolution (maximum resolution is 40 x 40 elements); arbitrary grid orientation and size; user-specified data stations and significant data levels (e.g., surface, 850 mb, 700 mb); user-controllable minimization of wind field divergence; time-weighted (centered) interpolation of data fields; arbitrary duration of meteorological episode; and multiple choices of output time interval (1, 2, 3, 4, 6, or 12 hours).

PB80-816069 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Flood Control. August, 1977-August, 1980 (Citations from the NTIS Data Base).
Rept. for Aug 77-Aug 80,
Robena J. Brown. Oct 80, 229p
Supersedes NTIS/PS-79/1052, and NTIS/PS-78/0774. See also 1964-1974, NTIS/PS-76/0593 and 1975-July, 1977, NTIS/PS-78/0773.

Research studies are presented involving floods as related to control, forecasting, urban planning, prevention, zoning, urbanization, and land use management. Flood control studies for specific towns and reports, generated by the Army Engineers which deal with specific areas have been excluded. (This updated bibliography contains 223 citations, 70 of which are new entries to the previous edition.)

PB80-851280 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Indoor Air Pollution. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Thomas H. Jones. Jun 80, 109p
NERACEDBNT0405
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers world-wide literature on indoor air pollution. The sources for such pollution can arise from inside the building, from outdoor aerosols and gaseous pollutants entering the building through infiltration and, in a few cases represented by the abstracts, from the building construction materials. The effect of various ventilation techniques on the indoor air quality is explored and reported on. (Contains 071 citations.)

PB80-851496 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Organic Solvent Recovery and Reclamation. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 149p NERACUSGNT0752
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the extraction, recovery, and reclamation of solvents and components of solvents which are utilized in various mineral, manufacturing, processing, and reprocessing industries are cited in this retrospective bibliography. (Contains 133 citations.)

PB80-851504 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Organic Solvent Recovery and Reclamation. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 196p NERACEDBNT0752
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the extraction, recovery, and reclamation of solvents and components of solvents which are utilized in various mineral, manufacturing, processing, and reprocessing industries are cited in this retrospective bibliography. (Contains 185 citations.)

PB80-851512 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Organic Solvent Recovery and Reclamation. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 84p NERACEI NT0752
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the extraction, recovery, and reclamation of solvents and components of solvents which are utilized in various mineral, manufacturing, processing, and reprocessing industries are cited in this retrospective bibliography. There are also reports pertaining to the design, operation, and performance of equipment used for this purpose. (Contains 070 citations.)

PB80-852197 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Particle Collection. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 28p NERACIAANT0350
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design and application of particle collection devices and methods. Among the types of particles discussed are dust, magnetic, nuclear, and radioactive particles. (Contains 075 citations.)

PB80-852205 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Particle Collection. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 55p
NERACUSGNT0350
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design and application of particle collection devices and methods. Among the types of particles discussed are dust, magnetic, nuclear, and radioactive particles. (Contains 034 citations.)

PB80-853633 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Incinerators for Refuse. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 120p
NERACEDBNT0647
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the applications of incinerators for refuse. Design criteria for hazardous and non-hazardous wastes, various applications of residues and heat recovery of incinerators are also included. (Contains 085 citations.)

PB80-853815 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Diatomaceous Earth. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 55p NERACUSGNT0704
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the applications or uses of diatomaceous earth, especially for filtration are included in this retrospective bibliography. (Contains 034 citations.)

PB80-853823 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Coal Mine Refuse Disposal. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 239p NERACEDBNT0747
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports about the control, disposal and recycling of coal wastes and coal related wastes from coal mining, coal preparation, coal gasification and coal burning operations are included in this retrospective bibliography. (Contains 099 citations.)

PB80-853831 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Coal Mine Refuse Disposal. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 80p NERACEI NT0747
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports about the control, disposal and recycling of coal wastes and coal related wastes from coal mining, coal preparation, coal gasification and coal burning operations are included in this retrospective bibliography. (Contains 054 citations.)

PB80-853872 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Air Pollution Control Equipment: Catalytic Converters. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 192p
NERACEDBNT0595
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the design, performance, evaluation and applicability of catalytic converters to pollution control, especially automotive emissions. Citations include descriptions of microprecessor based systems, three-way catalytic systems, chemical analysis and toxicological assessment of exhaust gases and current trends. (Contains 143 citations.)

PB80-854284 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Diatomaceous Earth. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 54p NERACEDBNT0704
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning the applications or uses of diatomaceous earth, especially for filtration, are included in this retrospective bibliography. (Contains 030 citations.)

PB80-854938 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Rapid Transit Systems. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 164p NERACIAANT0666
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the testing, evaluation, planning and economic impact of urban and intercity rapid mass transit systems. Citations include analyses of the availability and efficiency of different systems such as railways, electric-powered vehicles, air cushioned vehicles, monorails, busses and subways. (Contains 189 citations.)

PB80-854946 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rapid Transit Systems. September, 1975-June, 1980 (Citations from the NTIS Data Base).
Rept. for Sep 75-Jun 80,
Walter Van Put. Jun 80, 240p
NERACUSGNT0666
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the testing, evaluation, planning and economic impact of urban and intercity rapid mass transit systems. Citations include analyses of the availability and efficiency of different systems such as railways, electric-powered vehicles, air cushioned vehicles, monorails, busses and subways. (Contains 200 citations.)

PB80-854953 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rapid Transit Systems. August, 1974-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Aug 74-Jun 80,
Walter Van Put. Jun 80, 196p NERACEI NT0666
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the testing, evaluation, planning and economic impact of urban and intercity rapid mass transit systems. Citations include analyses of the availability and efficiency of different systems such as railways, electric-powered vehicles, air cushioned vehicles, monorails, busses and subways. (Contains 200 citations.)

PB80-854961 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rapid Transit Systems. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 108p
NERACEDBNT0666
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the testing, evaluation, planning and economic impact of urban and intercity rapid mass transit systems. Citations include analyses of the availability and efficiency of different systems such as railways, electric-powered vehicles, air cushioned vehicles, monorails, busses and subways. (Contains 094 citations.)

PB80-856339 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Electric Utilities. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 87p NERACUSGNT1043
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the application of operations research and systems analysis to the operations, performance, and management of electric utilities are contained in this retrospective bibliography. (Contains 064 citations.)

PB80-856347 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Electric Utilities. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 126p NERACEDBNT1043
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the applications of operations research and systems analysis to the operations, performance, and management of electric utilities are contained in this retrospective bibliography. (Contains 099 citations.)

PB80-857113 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vehicle Traffic Control. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 41p
NERACUSGNT0472
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, development and application of vehicle traffic control equipment and systems. Among the systems described are automatic vehicle identifiers for traffic management, urban traffic control systems for the reduction of indirect sources of air pollution and other automatic vehicle location devices and systems. (Contains 024 citations.)

PB80-857428 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Deep-Well Disposal. June, 1963-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 63-May 80,
John H. Frey. Jun 80, 51p NERACEDBNT0751
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the drilling and use of deep wells for disposal of wastes are contained in this retrospective bibliography. (Contains 034 citations.)

PB80-858525 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Metal Containing Liquid Waste. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 78p NERACEI NT0749
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the control, treatment, and disposal of metal containing industrial wastes and on the recovery or reclamation of metals from these wastes, especially electroplating wastes, are included in this retrospective bibliography. (Contains 068 citations.)

PB80-858533 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Treatment of Effluent Streams. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 60p NERACEDBNT0754
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the treatment of industrial (except mining) effluent streams for pollution control, purification, and waste disposal as well as for removal, reclamation, and recycling of various stream components are included in this retrospective bibliography. (Contains 039 citations.)

PB80-858541 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Treatment of Effluent Streams. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 108p NERACEI NT0754
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the treatment of industrial (except mining) effluent streams for pollution control, purification, and waste disposal as well as for removal, reclamation, and recycling of various stream components are included in this retrospective bibliography. (Contains 089 citations.)

PB80-859242 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Particle Collection. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 93p
NERACEDBNT0350
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design and application of particle collection devices and methods. Among the types of particles discussed are dust, magnetic, nuclear, and radioactive particles. (Contains 072 citations.)

PB80-859259 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Particle Collection. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 51p NERACEI NT0350
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design and application of particle collection devices and methods. Among the types of particles discussed are dust, magnetic, nuclear, and radioactive particles. (Contains 046 citations.)

PB80-859531 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Incinerators for Refuse. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 99p NERACUSGNT0647
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the applications of incinerators for refuse. Design criteria for hazardous and non-hazardous wastes, various applications of residues and heat recovery of incinerators are also included. (Contains 077 citations.)

PB80-859549 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Incinerators for Refuse. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 84p NERACEI NT0647
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the applications of incinerators for refuse. Design criteria for hazardous and non-hazardous wastes, various applications of residues and heat recovery of incinerators are also included. (Contains 067 citations.)

PB80-859697 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Air Pollution Control Equipment: Catalytic Converters. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 102p
NERACUSGNT0595
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the design, performance and applicability of catalytic converters. Citations include descriptions of microprocessor-based systems, toxicological assessment of exhaust gases, three-way catalysts, and current trends. (Contains 070 citations.)

PB80-859705 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.

Air Pollution Control Equipment: Catalytic Converters. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 83p NERACEI NT0595
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the design, performance and applicability of catalytic converters. Citations include descriptions of microprocessor-based systems, toxicological assessment of exhaust gases, three-way catalysts, and current trends. (Contains 060 citations.)

SAN-1470-T2(App.E) PC **A04**/MF **A01**
Dynatrend, Inc., Arlington, VA.
Development of a Risk Analysis Model. Appendix E. 1,000 Ton Per Day Anaerobic Digestion Plant Case Study, Final Report, October 1979.
Oct 79, 67p
Contract EC-77-C-03-1470

The Department of Energy (DOE) is investigating processes for the recovery of energy from urban wastes, with the intention of determining how the barriers standing in the way of commercialization of these processes can be overcome. Commercialization of any urban waste energy recovery process is constrained by many complex, uncertain components and interactions. Technical, economic, and institutional barriers presently exist which increase both the real and perceived risks of making such a venture commercially feasible. Current risks applicable to processes of this type may be categorized as: performance and reliability of technology; capital, operating, and maintenance costs; recovered product quality and quantity; waste (feedstock) quality and quantity; and market (energy buyer) stability. Anaerobic digestion is a biological technique for the production of usable gases from urban waste which provides a degree of promise for producing energy in commercial quantities. A risk analysis methodology suitable for the use of DOE's Office of Buildings and Community Systems (BCS) was developed by Dynatrend Inc. The specific process analyzed was in experimental operation as a pilot plant in Pompano Beach, Florida. (ERA citation 05:029270)

UCID-18594 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
User Manual for SILVA: a Computer Code for Estimating Effects of Pollution on the Growth and Succession of Western Coniferous Forests.
M. C. Axelrod, and J. R. Kercher. Jul 80, 81p
Contract W-7405-ENG-48

SILVA is a code developed for simulating impacts of SO sub 2 pollution on the growth and succession of western coniferous forests. It has been specifically parameterized for application to the ponderosa pine and mixed conifer forests of the Sierra Nevada, California. JABOWA, a code for simulating northeastern USA forests, was used as a framework for SILVA. The following elements are described: sample inputs; code structure; data, dynamic, control and internal variables; sample output, and considerations for setup at the user's computer installation. A listing is provided along with descriptions of all subroutines and functions. (ERA citation 05:031128)

UCRL-52532(V.1) PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Automation of Continuous-Flow Analyzers for Trace Constituents in Water. Volume 1. Operator Instructions.
R. W. Crawford, and F. B. Stephens. 4 Apr 79, 62p
Contract W-7405-ENG-48

This document has been written as an aid to an operator when running continuous flow analyses using the LLL programs. It refers specifically to the Technicon AutoAnalyzer instrument. The system, hardware and software, is described so that the operator can relate to the sequence of operations. The importance of the arrangement of solutions in the automatic sampler is emphasized. All prompts and responses are discussed in detail, including editing features and the various options available. In addition, the output and line-printer programs are described along with special auxiliary programs to be used in troubleshooting. (ERA citation 05:031099)

UCRL-83294 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Correlation Between Predicted and Observed Levels of Airborne Tritium at Lawrence Livermore Laboratory Site Boundary.
C. L. Lindeken, W. J. Silver, A. J. Toy, and J. H. White. 19 Feb 80, 10p CONF-800586-1
Contract W-7405-ENG-48
ANS topical meeting, Dayton, OH, USA, 1 May 1980.

At the Lawrence Livermore Laboratory, a computer code based on the Gaussian plume model is used to estimate radiation doses from routine or accidental release of airborne radioactive material. Routine releases of tritium have been used as a test of the overall uncertainty associated with these estimates. The ration of concentration to release rate at distances from the two principal release points to each of six site boundary sampling locations has been calcuated using local meteorological data. The concentration of airborne tritiated water vapor is continuously measured at the six sampling stations as part of the Laboratory's environmental monitoring program. Comparison of predicted with observed annual tritiated water concentrations in 1978 showed an average ratio of 2.6 with a range of from 0.97 to 5.8. (ERA citation 05:029605)

13C. Construction Equipment Materials, and Supplies

CEA-CONF-4562 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. des Etudes Mecaniques et Thermiques.
Tests and Calculations of Reinforced Concrete BEAMS Subjected to Dynamic Reversed Loads.
J. Gauvain, A. Hoffmann, and M. Livolant. 1978, 4p CONF-7811163-1
Engineering design for earthquake environments, London, UK, 7 Nov 1978.
U.S. Sales Only.

This study presents the tests of a reinforced concrete beam conducted by the Department of Mechanical and Thermal Studies at the Centre d'Etudes Nucleaires, Saclay, France. The actual behavior of nuclear power plant buildings submitted to seismic loads is generally non linear even for moderate seismic levels. The non linearity is specially important for reinforced concrete beams type buildings. To estimate the safety factors when the building is designed by standard methods, accurate non linear calculations are necessary. For such calculations one of the most difficult point is to define a correct model for the behavior of a reinforced beam subject to reversed loads. For that purpose, static and dynamic experimental tests on a shaking table have been carried out and a model reasonably accurate has been established and checked on the tests results. (Atomindex citation 11:508072)

CONF-800393-1 PC **A03**/MF **A01**
Argonne National Lab., IL.
Advances in Nondestructive Evaluation Methods for Inspection of Refractory Concretes.
W. A. Ellingson. 1980, 27p
Contract W-31-109-ENG-38
Symposium on premature failure in monolithic refractory constructions: preventive and remedial treatment, Las Vegas, NV, USA, 2 Mar 1980.

Refractory concrete linings are essential to protect steel pressure boundaries from high-temperature agressive erosive/corrosive environments. Castable refractory concretes have been gaining more acceptance as information about their performance increases. Economic factors, however, have begun to impose high demands on the reliability of refractory materials. Advanced nondestructive evaluation methods are being developed to assist the refractory user. Radiographic techniques, thermography, acoustic-emission detection, and interferometry have been shown to yield information on the structural status of refractory concrete. Methods using exp 60 Co radiation sources are capable of yielding measurements of refractory wear rate as well as images of cracks and/or voids in pre- and post-fired refractory linings up to 60 cm thick. Thermographic (infrared) images serve as a qualitative indicator of refractory spalling, but quantitative measurements are difficult to obtain from surface-temperature mapping. Acoustic emission has been shown to be a qualitative indicator of thermomechanical degradation of thick panels of 50 and 95% Al sub 2 O sub 3 during initial heating and cooling at rates of 100 to 220 exp 0 C/h. Laser interferometry methods have been shown to be capable of complete mappings of refractory lining thicknesses. This paper will present results obtained from laboratory and field applications of these methods in petrochemical, steel, and coal-conversion plants. (ERA citation 05:030931)

PB80-227200 PC **E02**/MF **E02**
Building Research Station, Watford (England).
The Estimation of the Elastic Modulus of Concrete for the Design of Structures.
Current papers,
D. C. Teychenne, L. J. Parrot, and C. D. Pomeroy. c1978, 17p CP-23/78

This paper shows that the elastic modulus of concrete depends on the aggregate used, the compressive strength of the concrete, the aggregate/cement ratio and the age at test. It is suggested that the estimation of the elastic modulus E should be made at one of three levels, the choice depending on the importance of the estimate. (Copyright (c) British Crown Copyright.)

PB80-854722 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Mechanical Properties of Concrete. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 67p
NERACEDBNT0871
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the mechanical characteristics and properties of concrete. Also included is a description of methods used for reinforcement, increasing durability and improvement of other mechanical properties of concrete through the addition of polymer latexes. (Contains 050 citations.)

PB80-854730 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Mechanical Properties of Concrete. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 171p NERACEI NT0871
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the mechanical characteristics and properties of concrete. Also included is a description of methods used for reinforcement, increasing durability and improvement of other mechanical properties of concrete through the addition of polymer latexes. (Contains 191 citations.)

PB80-854748 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Mechanical Properties of Concrete. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 94p
NERACUSGNT0871
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the mechanical characteristics and

properties of concrete. Also included is a description of methods used for reinforcement, increasing durability and improvement of other mechanical properties of concrete through the addition of polymer latexes. (Contains 085 citations.)

PB80-856180 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Conveyor Systems. February, 1974-June, 1980 (Citations from the NTIS Data Base).
Rept. for Feb 74-Jun 80,
William V. Sassi. Jun 80, 226p
NERACUSGNT0969
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe and analyze the design and construction of various types of conveyor systems currently in use. Among the different systems discussed are belt, bucket, chain, hydraulic, and pneumatic conveyors, and their application to industry. (Contains 200 citations.)

PB80-856198 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Conveyor Systems. August, 1977-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Aug 77-Jun 80,
William V. Sassi. Jun 80, 183p NERACEI NT0969
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe and analyze the design and construction of various types of conveyor systems currently in use. Among the different systems discussed are belt, bucket, chain, hydraulic, and pneumatic conveyors, and their application to industry. (Contains 200 citations.)

PB80-856206 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Conveyor Systems. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 47p NERACIAANT0969
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe and analyze the design and construction of various types of conveyor systems currently in use. Among the different systems discussed are belt, bucket, chain, hydraulic, and pneumatic conveyors, and their application to industry. (Contains 041 citations.)

PB80-856214 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Conveyor Systems. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 189p
NERACEDBNT0969
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe and analyze the design and construction of various types of conveyor systems currently in use. Among the different systems discussed are belt, bucket, chain, hydraulic, and pneumatic conveyors, and their application to industry. (Contains 200 citations.)

13D. Containers and Packaging

PB80-227192 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Soil-Structure Interaction and Deformation Problems with Large Oil Tanks.
Current papers,
A. D. M. Penman. c1978, 20p CP-14/78

This paper describes eight case histories of failures of tanks on pad and piled foundations and gives several examples of the observed distortions of tanks in service. Methods that have been used to limit differential settlements are discussed and limits are given for acceptable differential settlements under tank floors and shells. The paper concludes with design guidance notes. (Copyright (c) British Crown Copyright.)

PB80-853369 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Packaging Machines. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 53p
NERACUSGNT0473
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the design and application of processing and packaging machinery and equipment. An analysis of United States and foreign made packaging equipment is also included. (Contains 052 citations.)

RFP-2998 PC **A03**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Quantitative Study of Mixing in Annular and Raschig Ring Filled Tanks.
M. A. Fredrickson. 14 Jul 80, 31p
Contract AC04-76DP03533

A quantitative study of mixing, which utilized the exit age distribution theory, has been completed for bench-scale annular and raschig ring filled tanks, in addition to a pilot-scale annular tank. A study of mixing and fluid flow in a full-scale, single-entry, raschig ring filled tank also was initiated. Results showed the bench-scale raschig ring filled tank approached plug-flow (no mixing) behavior. In a bench-scale annular tank, regardless of whether fluid entered tangentially or nontangentially, the vessel approached continuously stirred tank reactor behavior (perfect mixing). The pilot-scale annular tank approached continuously stirred tank reactor behavior only when tangential entry was used. Mixing in the full-scale raschig ring filled tank he tank did not approach eithr the perfect or the no mixing situations. Instead, the tank had a flow pattern in which solution channeled through a small volume of the tank, leaving the regions outside the channel effectively inactive. (ERA citation 05:031027)

UCRL-84046 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Holographic and Acoustic Emission Evaluation of Pressure Vessels.
D. M. Boyd. 5 Mar 80, 7p CONF-800804-5
Contract W-7405-ENG-48
ASME century 2 emerging technology conference, San Francisco, CA, USA, 10 Aug 1980.

Optical holographic interfereometry and acoustic emission monitoring were simultaneously used to evaluate two small, high pressure vessels during pressurization. The techniques provide pressure vessel designers with both quantitative information such as displacement/strain measurements and qualitative information such as flaw detection. The data from the holographic interferograms were analyzed for strain profiles. The acoustic emission signals were monitored for crack growth and vessel quality. (ERA citation 05:029477)

13E. Couplings, Fittings, Fasteners, and Joints

HEDL-SA-1913 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Spatial Averaging Algorithms for Ultrasonic Inspection of Austenitic Stainless Steel Welds.
J. E. Horn, C. S. Cooper, and T. E. Michaels. 7 Apr 80, 13p CONF-800668-1
Contract AC14-76FF02170

International symposium on ultrasonic materials characterization, Gaithersburg, MD, USA, 4 Jun 1980.

Interpretation of ultrasonic inspection data from stainless steel welds is difficult because the signal-to-noise ratio is very low. The three main reasons for this are the granular structure of the weld, the high attenuation of stainless steel, and electronic noise. Averaging in time at the same position in space reduces electronic noise, but does not reduce ultrasonic noise from grain boundary scattering. Averaging wave-forms from different spatial positions helps reduce grain noise, but desired signals can destructively interfere if they shift in time. If the defect geometry is known, the ultrasonic waveforms can be shifted before averaging, ensuring signal reinforcement. The simplest geometry results in a linear time shift. An averaging algorithm has been developed which finds the optimum shift. This algorithm computes the averaged, or composite waveform as a function of the time shift. The optimum occurs when signals from a reflector become aligned in time, producing a large amplitude composite waveform. This algorithm works very well, but requires significant computer time and storage. This paper discusses this linear shift averaging algorithm, and considers an implementation using frequency domain techniques. Also, data from several weld defects are presented and analyzed. (ERA citation 05:031072)

PATENT-4 211 502 Not available NTIS
Department of the Navy Washington DC
Breakaway Pin Release.
Patent,
Wayne R. Tausig. Filed 6 Jul 79, patented 8 Jul 80, 6p AD-D007 428/6, PAT-APPL-6-055 923
Supersedes PAT-APPL-6-055 923, AD-D006 688.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a pin release assembly in which a release pin and a pull pin have mating portions which interlock within a fixed collar. The interlocking surfaces of the mating portions are oriented parallel to or normal to the longitudinal axis of the pins so that no frictional side loads are produced when the interlocked pins are pulled in a direction parallel to the longitudinal axis. The release is actuated by sliding the interlocked pins within the collar. The length of travel of the release pin necessary to accomplish the desired release is coordinated with the length of travel of the mating portions within the collar so that the interlocking surfaces are pulled from the confinement of the collar at the same time as the release is accomplished, thereby permitting the pull pin and the release pin to freely separate.

PB80-850811 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rivets and Riveting. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
T. David Kennedy. Jun 80, 87p
NERACIAANT0368
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited in this document are a variety of articles on riveted joints and connections such as apply to design, analysis and testing. Construction techniques, rivet patterns, cyclic and thermal stresses and load distribution are typical subjects dealing with rivets and riveting. Aircraft construction is stressed but many more general articles are covered and should be useful in many applications of designing with rivets. (Contains 120 citations.)

PB80-857907 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fastener Design, Materials and Performance. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
T. David Kennedy. Jun 80, 69p
NERACIAANT0283
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles in this bibliography can provide help in the design and/or selection of fasteners. Since requirements for fasteners including bolts, screws and rivets vary considerably based upon the specific application, the topics covered are also broad and include corrosion, fatique, thread design, preload, residual stress, self-locking fasteners, plus coatings and materials. (Contains 090 citations.)

PB80-857915 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fastener Design, Materials and Performance. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 113p NERACEI NT0283
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography can provide help in the design and/or slection of fasteners. Since requirements for fasteners including bolts, screws and rivets vary considerably based upon the specific application, the topics covered are also broad and include corrosion, fatique, thread design, preload, residual stress, self-locking fasteners, plus coatings and materials. (Contains 138 citations.)

PB80-857923 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Analyses of Bolted Joints and Connections. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 46p NERACEI NT0284
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles listed in this bibliography cover a wide range of topics as relate to bolted joints and connections. Emphasis is on analytical methods for calculating loads, stresses, stiffness, etc., and encompasses static and dynamic forces. Engineers designing bolted junctions should be able to improve their analytical methods by becoming aware of the methods and techniques developed by other engineers as applied to various configurations, such as pipe, pressure vessels, end-plates, beams, thin sheets, etc. (Contains 045 citations.)

13F. Ground Transportation Equipment

AD-A088 404/9 MF **A01**
Admiralty Marine Technology Establishment Haslar (England)
Recapped Tire Comparison.
Final technical rept. 2 Nov 78-27 Apr 79,
John Nowicke, and Alvin L. Holton. 17 Jul 79, 68p TARADCOM-TR-12451
Contract DAAK30-78-C-0084
Availability: Microfiche copies only.

A test program has been conducted to compare the wear characteristics of conventional retread and precured retread 9:00 X 20 tires. An M-35 2 1/2 ton truck with a 5000 pound highway load was driven 9000 miles on a combination of paved, secondary and cross country surfaced roads with each type of retread tire in this evaluation. The precured retread tires exhibited about 10% less wear than the conventional retread tires on this test based on sample means. The precured tires were also more consistent in wear resistance. (Author)

AD-A088 468/4 PC **A03**/MF **A01**
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
A Review of the Anthropometric and Strength Standards of the Canadian Motor Vehicle Safety Standard,
I. Noy, M. Taylor, and D. Beevis. Feb 80, 31p
Rept no. DCIEM-80-R-29

This paper reviews the anthropometric and strength criteria used by the CMVSS to specify vehicle design limits. The review was concerned with two main objectives: To review the format and content of the CMVSS to ascertain whether the criteria contained therein are the most pertinent to vehicle safety characteristics and whether such criteria are presented in the most effective way possible; Two review available US and Canadian anthropometric literature to determine the extent to which existing data can be applied to standards for the design of vehicles for Canadian drivers and the cost/benefit of undertaking a comprehensive survey to provide more reliable data. (Author)

CONF-800334-17 PC **A02**/MF **A01**
Argonne National Lab., IL.
Environmental Assessment of DOE Transportation Programs.
M. J. Bernard, III, and M. K. Singh. 1980, 12p
Contract W-31-109-ENG-38
DOE environmental control symposium, Reston, VA, USA, 17 Mar 1980.

At the first DOE Environmental Control Symposium the process of environmental planning, assessment, research and control for the projects of the DOE Assistant Secretary for Conservation and Solar's (ASCS) Office of Transportation Programs (OTP) was presented. In the months since that symposium the process has been in continual use with a large measure of success. To illustrate how well it has worked, the treatment of electric vehicle battery off-gassing is presented here. Further, since most of the environmental activity has been directed toward producing Environmental Assessments (EA), the results of these EAs are also presented. This presentation begins with a short status report. It then illustrates the process by following EV battery off-gassing from its identification as a concern in an early EDP to research centering upon its resolution. The last portion of the paper focuses on the findings of the current EAs. (ERA citation 05:031122)

CONF-800419-4 PC **A02**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD. Transportation Consulting Div.
Third Interim Report on Status of Gas Turbine Transit Bus Demonstration Program.
15 Apr 80, 15p
Symposium on automotive propulsion systems, Dearborn, MI, USA, 14 Apr 1980.

Progress in a program for demonstrating the use of gas turbines in city buses is reported. Five prototype gas turbine engines, Model GT-40404, manufactured by the Detroit Diesel Allison Division of General Motors Corporation, are being integrated into five RTS-II model transit coaches, manufactured by General Motors Corporation and supplied by the Mass Transit Administration (MTA) of Baltimore, Maryland. They will be acceptance tested at the Transportation Research Center proving grounds in Ohio, where one gas turbine coach will also be performance and mileage tested against a diesel RTS-II coach. The first diesel-to-turbine engine conversion is done. The second conversion is almost completed. The demonstration plan for the 5 gas turbine coaches has been finalized. (ERA citation 05:030836)

CONS-5160-T1 PC **A06**/MF **A01**
Union Carbide Corp., Tonawanda, NY. Linde Div.
Insulation Development for High-Temperature Batteries for Electric Vehicle Application. Final Report.
Dec 79, 114p
Contract EM-78-C-01-5160

The objective of this contract is to develop and demonstrate a high performance, vacuum insulation which is capable of withstanding 15 psi plus battery loading with low compression operating in the 660 to 840 exp 0 F range. The developed insulation would allow construction of rectangular, lightweight and low-cost, vacuum-insulated enclosures for electric vehicles using Na/S or Li/MS batteries. The goals of the program are to develop a vacuum insulation with the following properties: thermal conductivity 140 x 10 exp -5 Btu/h-ft exp 0 F, density, 18 lbs/ft exp 3 and compression 10% from 0 to 15 psi load. A new milestone in high-temperature, load-bearing, preformed insulation was achieved. The two insulation systems demonstrated to-date have exceeded the goals of the program. Pegged Multi-Foil system has a measured conductivity of 100 x 10 exp -5 Btu/h-ft exp 0 F between 840 and 75 exp 0 F, density 11 lbs/ft exp 3 and compression of 10%. The second system which exceeded the goals of the program is a Linde Multi-Foil inslation with discrete load-carrying support areas. It has a measured thermal conductivity of 95 x 10 exp -5 Btu/h-ft exp 0 F, a density of 15 lbs/ft exp 3 and a compression of 21%. A third inslation is a continuous support, load-bearing board system. Although the thermal conductivity and density are above the goal of the program, the system is very practical and may be used in specialized applications; i.e., forklift trucks. The best load-bearing board insulation system developed to-date has a conductivity of 224 x 10 exp -5 Btu/hr-ft exp 0 F, a density of 22 lbs/ft exp 3 and a compression of 7%. It is believed that the new insulation systems need further development in order to establish their long-term stability, handleability and cost-effective production. (ERA citation 05:030837)

COO-2566-53-T1 PC **A09**/MF **A01**
Ford Motor Co., Dearborn, MI.
Ford/DOE Sodium-Sulfur Battery Electric Vehicle Development and Demonstration. Phase I-1. Final Report.
1979, 184p
Contract EY-76-C-02-2566

The results of Phase I-A analyses and design studies are presented. The objective of the Phase I-A effort was to evaluate the sodium-sulfur battery, in an existing conventional production automobile, as a potential power source for an electric vehicle. The Phase I-A work was divided into five (5) major sub-tasks as follows: vehicle specification subtask; NaS battery packaging study sub-task; vehicle packaging layout sub-task; electrical system study sub-task; and system study sub-tasks covering performance and economy projections, powertrain and vehicle safety issues and thermal studies. The major results of the sodium-sulfur battery powered electric vehicle study program are: the Fiesta was chosen to be the production vehicle which would be modified into a 2-passenger, electric test bed vehicle powered by a NaS battery; the vehicle mission was defined to be a 2-passenger urban/suburban commuter vehicle capable of at least 100 miles range over the CVS driving cycle and a wide open throttle capability of 0 to 50 mph in 14 seconds, or less; powertrain component specifications were defined; powertrain control strategy has been selected; and a suitable test bed vehicle package scheme has been developed. (ERA citation 05:030838)

DOE/NASA/1004-9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Impact of Propulsion System R and D on Electric Vehicle Performance and Cost.
H. J. Schwartz, and A. L. Gordan. 1980, 17p
NASA-TM-81548
Contract AI01-77CS51044

The propulsion subsystem (motor, motor controller, transmission, and differential but excluding the battery) is a major factor in the purchase price and cost of ownership of an electric vehicle. Three propulsion system characteristics: efficiency, weight, and manufacturing cost influence price and operating cost as seen by the consumer. a study has been made of the relative impact of the three factors on the cost of buying and operating a traffic-compatible electric vehicle. The study concludes that propulsion system technology advances can result in a major reduction in the sticker price of an electric vehicle and a smaller, but significant, reduction in overall cost of ownership. The paper discusses the assumptions, methodology, and results of the study. (ERA citation 05:030839)

DOE/NASA/1011-31 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Preliminary Results of Steady State Characterization of the Near Term Electric Vehicle Breadboard Propulsion System.
N. B. Sargent. Jul 80, 11p NASA-TM-81546
Contract AI01-76CS51011

Steady state test results on a breadboard version of the General Electric Near Term Electric Vehicle (ETV-1) are presented. The breadboard was built

using exact duplicate vehicle propulsion system components with few exceptions. Full instrumentation was provided to measure individual component efficiencies. Tests were conducted on a 50 hp dynamometer in the NASA Lewis Research Center Road Load Simulator Facility. (ERA citation 05:030840)

N80-29546/2 PC A12/MF A01
Jet Propulsion Lab., Pasadena, CA. Electrical Hybrid Vehicle System.
An Assessment of Inductive Coupling Roadway Powered Vehicles.
K. O. Leschly, A. Feinberg, R. Heft, and G. Warren. 15 Aug 80, 263p NASA-CR-163437, JPL-PUB-79-115
Contracts NAS7-100, EM-78-I-01-4209

The technical concept underlying the roadway powered vehicle system is the combination of an electrical power source embedded in the roadway and a vehicle-mounted power pickup that is inductively coupled to the roadway power source. The feasibility of such a system, implemented on a large scale was investigated. Factors considered included current and potential transportation modes and requirements, economics, energy, technology, social and institutional issues. These factors interrelate in highly complex ways, and a firm understanding of each of them does not yet exist. The study therefore was structured to manipulate known data in equally complex ways to produce a schema of options and useful questions that can form a basis for further, harder research. A dialectical inquiry technique was used in which two adversary teams, mediated by a third-party team, debated each factor and its interrelationship with the whole of the known information on the topic.

N80-30229/2 PC A02/MF A01
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
A Laboratory Facility for Electric Vehicle Propulsion System Testing.
N. B. Sargent. 1980, 11p NASA-TM-81574, DOE/NASA/1011-32
Presented at Intern. Congr. Of Transportation, Dearborn, Mich., 15-17 Sep. 1980; Sponsored in Cooperation with Vehicle Technology Society and IEEE, Society of Automotive Engineers, and Inst. Of Electrical Engineers.

The road load simulator facility located at the NASA Lewis Research Center enables a propulsion system or any of its components to be evaluated under a realistic vehicle inertia and road loads. The load is applied to the system under test according to the road load equation: $F(net) = K1F1 + K2F2V + K3 \text{ sq } V + K4(dv/dt) + K5 \sin \text{theta}$. The coefficient of each term in the equation can be varied over a wide range with vehicle inertial representative of vehicles up to 7500 pounds simulated by means of flywheels. The required torque is applied by the flywheels, a hydroviscous absorber and clutch, and a drive motor integrated by a closed loop control system to produce a smooth, continuous load up to 150 horsepower.

PB80-216203 PC A16/MF A01
Simpson and Curtin, Philadelphia, PA.
Camden County Coordinated Mass Transportation Systems Study. Phase II. Appendices A, B, C, and D.
Final rept.
Jun 80, 371p UMTA-IT-09-0050-80-2
See also PB80-216195. Sponsored in part by Camden County Planning Board, NJ.

The 1970s set in motion a continuing transportation planning program that would provide an efficient and cost effective system of public transportation services for Camden County. Camden County initiated a systematic planning effort--the Coordinated Mass Transit Systems (CMTS)--to analyze the transportation needs of the county residents and subsequently to develop a transportation improvement program. Phase I of the CMTS study was conpleted in July 1977, and it focused on specific transportation issues such as an assessment of the quality of service; evaluation of public information programs; and the role of the county in public transportation. Phase II work was completed in June 1979. Phase II study, this report, focused on three areas: (1) feasibility of park-n-ride express bus service between the future PATCO Berlin Station site and the Lindenwold Station; (2) analysis of all paratransit services; and (3) analysis of all fixed-route transit services in the county. This report documents the evaluation steps and the recommendations of the CMTS Phase II Study. It also contains an Executive Summary that highlights the principal conclusions and recommendations of both Phase I and Phase II study efforts.

PB80-216534 PC A05/MF A01
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
NCSS (National Crash Severity Study) Statistics: Light Trucks and Vans.
Special rept. Apr 78-Mar 79,
Leda L. Ricci. Jun 80, 98p UM-HSRI-80-37, DOT-HS-805 530
Contract DOT-HS-8-01944

This document has been prepared from a subset of the National Crash Severity Study data restricted to light trucks and vans involved in sampled accidents. The report is a supplement to the NCSS Statistics: Passenger Cars dated June 1980. The National Crash Severity Study (NCSS) is a major accident data collection program of the National Center for Statistics and Analysis (NCSA) of the National Highway Traffic Safety Administration (NHTSA). Data collection began in January 1977 and terminated in March 1979. This report presents tabulations of the data for the last twelve months of the study, thus covering the period April 1, 1978 through March 31, 1979. Accidents were investigated in seven geographic areas within the continental United States selected so that the aggregate of the areas closely resembles the urbanization distribution of the entire country. Within each area a stratified sampling plan was used to gather detailed information on passenger cars, light trucks, and vans (and their occupants) in crashes which were severe enough to require that the vehicles be towed from the scent. The combined investigations presented here total 905 crashes, 951 towed light trucks and vans, 1,608 case vehicle occupants, and 104 fatalities. The tables in this report represent only a very broad treatment of the data.

PB80-217821 PC A02/MF A01
Prism Corp., Washington, DC.
Consumer Acceptance of RSV (Research Safety Vehicle) Features. Volume I: Executive Summary.
Final rept. Apr-Jun 80,
Naomi H. Henderson, and Kristin N. Curran. Jun 80, 11p DOT-HS-805-454
Contract DTNH-22-80-C-07268
See also Volume II, PB80-217839.

This report covers findings from a series of 23 focus panels among consumers in six U.S. cities, researching attitudes and opinions about safety features of the Minicars' Research Safety Vehicle.

PB80-217839 PC A05/MF A01
Prism Corp., Washington, DC.
Consumer Acceptance of RSV (Research Safety Vehicle) Features. Volume II: Comprehensive Report on 23 Focus Groups to Investigate Consumer Acceptance of Research Safety Vehicle Features.
Final rept. Apr-Jun 80,
Naomi H. Henderson, and Kristin N. Curran. Jun 80, 83p DOT-HS-805-455
Contract DTNH-22-80-C-07268
See also Volume I, PB80-217821.

This report covers findings from a series of 23 focus panels among consumers in six U.S. cities, researching attitudes and opinions about safety features of the Minicars' Research Safety Vehicle.

PB80-219082 PC A03/MF A01
National Transportation Safety Board, Washington, DC. Bureau of Technology.
Railroad Accident Report - Head-End Collision of Nine Burlington Northern Locomotive Units with a Standing Freight Train, Angora, Nebraska, February 16, 1980.
12 Aug 80, 33p NTSB-RAR-80-7

On February 16, 1980, Burlington Northern (BN) freight train Extra 2048 East (No. 178) stalled on an ascending grade about 4.7 miles west of Angora, Nebraska. The crew was instructed to uncouple the three-unit locomotive from the train and move it east to Angora to meet the six-unit locomotive of Extra 7814 West at Angora. The nine locomotive units were coupled together and moved westward on the descending grade toward the standing train. While moving at a speed of about 46 mph, the locomotive units collided with the standing portion of train No. 178. The head brakeman of train No. 178 and the engineer of Extra 7814 West were killed, and three crewmembers of Extra 7814 were injured. Damage was estimated at $1,297,000. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer of train No. 178 to control the speed of the nine locomotive units on the return downgrade trip to the standing train. Contributing to the accident were the improper coupling of the nine locomotive units; the lack of sufficient supervision and instructions; the failure of the conductors of the two trains and the engineer of BN Extra 7814 West to perform their duties properly and the failure of the train dispatcher to issue adequate orders and instructions.

PB80-221138 PC A04/MF A01
Transportation Research Board, Washington, DC.
Transportation System Analysis and Planning 1980,
Melvyn D. Cheslow, Thomas Dooley, William S. Herald, Catherine E. Meyers, and John G. Schoon. 1980, 74p TRB/TRR-751, ISBN-0-309-03061-7
Library of Congress catalog card no. 80-21248. Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

The 11 papers in this report deal with the following areas: issues in the evaluation of metropolitan transportation alternatives; analysis of downtown people mover systems by using the DPM simulation model; generating alternatives for alternatives analysis; factors affecting willingness to conserve gasoline (abridgment); park-and-ride planning for energy conservation: an optimization methodology; comparison of multicriteria optimization methods in transport project evaluation (abridgment); goal-programming approach to multiobjective highway network design model (abridgment); development of year-2000 alternative transportation plans for the Delaware Valley region (abridgment); transportation planning for small communities: western Canadian experience; tranferability of trip generation models; and analysis of intercity travel markets in New York State (abridgment).

PB80-224108 PC A09/MF A01
Systems Technology, Inc., Hawthorne, CA.
Relationship Between Truck Ride Quality and Safety of Operations: Methodology Development.
Final rept.,
Richard H. Klein, R. Wade Allen, and James C. Miller. Jun 80, 189p SRI-TR-1155-1, DOT-HS-805 494
Contract DOT-HS-9-02310

This report presents an overall program plan, including sample experimental design, which can be used to determine the effects of vehicle vibration upon driver performance. The recommended solution is to combine a fixed-base driving simulator facility with a high-frequency motion base 'ride quality' facility. The result is an interactive 'ride simulator' that allows line drivers to perform real-world tasks while under very tightly controlled traffic and vibration scenarios. This approach has never been attempted before. Ride simulator facilities that meet the necessary requirements exist, and the driving simulator capability also exists at several research organizations throughout the U.S. The motion and driving task facilities could be brought together in about one year's time to the point of being ready to provide: an instrumented truck cab mounted on motion base and tied into a computer facility; various levels of cab acceleration data 'measured' from various trucks on both rough and smooth roads; and various driving scenarios. This simulator phase would require a minimum of 18 line driver subjects and should take about three months (including data analysis) to complete. When added to one year's preparation and three

months for final report preparation, the overall program could be accomplished in about 18 months. The results of this study, if implemented by the NHTSA via subsequent procurement actions, would be used to determine if rulemaking standards for truck ride quality are warranted.

PB80-225881 PC **A03**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Octane Requirements of 1975 Model Year Automobiles Fueled with Unleaded Gasoline.
Technical rept.
Aug 75, 29p EPA-AA-TAEB-75-28

Some concern has been voiced that a large portion of 1975 model year automobiles will have engine knock problems when operating with unleaded gasoline of 91 RON/83 MON. Unleaded fuel of 91 RON/83 MON is the only unleaded gasoline that will be available at most of the retail pump outlets. This will occur because most of the gasoline companies will limit their production to satisfying only the minimum requirements of the current EPA regulations. These regulations require availability of unleaded gasoline of 'not less than 91 Research Octane Number'. The concerned groups indicate that the percentage of cars satisfied with this unleaded gasoline will be much lower than the percentage of past years. These concerned groups point out that too many cars will have to resort to spark retard for elimination of knock, and that this will result in a substantial loss in fuel economy. The purpose of this report is to document and discuss, concisely, that information which is relevant to this potential problem concerning engine knock.

PB80-225949 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Research on Fuel Conservation for Cars,
M. H. L. Waters, and I. B. Laker. c1980, 39p
TRRL-LR-921

Fuel conservation for cars is considered for the short-to-medium term period when natural oil is available, but becoming scarce and expensive. Conservation measures are considered under three headings: driver performance; vehicle design and operations; road layout and traffic. Examples of potential fuel savings are given from TRRL and other research work. Driver education could perhaps save 10 to 15 percent of car fuel, and a target fuel economy for a new car design is suggested as 50 miles per gallon, instead of the present 30 miles per gallon. Traffic management schemes to reduce congestion can make some contribution. The value of research in fuel conservation is emphasized. (Copyright (c) Crown Copyright 1980.)

PB80-226012 PC **A12**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
General Legal Considerations Relevant to Highway Safety Countermeasure Development and Implementation.
Final rept. Nov 76-Oct 79,
Paul A. Ruschmann, Murray Greyson, John W. McNair, and Kent B. Joscelyn. Oct 79, 264p UM-HSRI-79-73, DOT-HS-805 525
Contract DOT-HS-7-01536

An analysis is made of the general constitutional, statutory, and judicially imposed limits on the power of government to make and enforce laws prohibiting unsafe driving behavior in general and to implement specific countermeasures. Essential principles of the American legal system--including the impact of constitutional provisions, elements of the criminal, civil, and administrative law system, and the methodology by which courts resolve legal disputes--were outlined. Specific legal principles addressed in this document include: the requirement of substantive and procedural due process of law; the guarantee of equal protection of the laws; the prohibition against unreasonable arrests, searches, and seizures; the privilege against compelled self-incrimination; and constitutional, statutory, and common-law privacy rights. The rights of probationers, and other persons convicted of or charged with traffic offenses, are also discussed.

PB80-226103 PC **A04**/MF **A01**
Tri-County Metropolitan Transportation District of Oregon, Portland.
Noise Reduction Retrofit for a 'New Look' Flexible Transit Bus: Service Bulletin.
Final rept. Jun 78-Jan 80,
Michael C. Kaye. Sep 80, 66p DOT-TSC-UMTA-80-16, UMTA-OR-06-0005-80-1
Sponsored in part by Environmental Protection Agency, Washington, DC. Office of Noise Abatement and Control.

This document presents instructions on how to apply a noise treatment to a contemporary city transit bus without extensive structural alteration. Baseline bus configuration, noise ratings, and performance benchmarks are presented for a Flexible 111DC-DO61 transit bus powered by a Detroit Diesel 8V-71N engine. The concepts and much of the hardware described in this report are transferable to similar buses. The information presented herein is of interest primarily to transit bus operators wanting to reduce noise by practical means, and to government agencies, manufacturers, and planners concerned with reducing the noise of buses in service at a moderate cost. In this report instructions are given on how to retrofit the engine with a turbo-charger and ancillary hardware. Acoustic benefits and performance side-effects are given. One beneficial side-effect, because of turbo-charging, is reduced harmful exhaust emissions. Another, because of smaller injectors and reduced exhaust back pressure, is fuel conservation. The instructions in this report are complete with sources for manufactured components and raw materials, and with mechanical drawings for components to be locally fabricated. Illustrations and text direct installation as well as effects of noise ratings and performance side-effects are also presented. In this report practical application is coupled with theoretical explanation throughout.

PB80-226368 PC **A06**/MF **A01**
Iowa State Univ., Ames. Engineering Research Inst.
A Transit Assistance Program for State Employees.
Final rept.,
E. J. Kannel, S. J. Polito, and R. Yun-Hao Woo. Jun 80, 118p ISU-ERI-AMES-80215, UMTA-IA-11-0003-80-1
Contract UMTA-IA-11-0003

The research presented in this report evaluates a transit assistance program undertaken with congestion and land use issues as a foundation. More specifically, the program sought to relieve pressure on over-crowded parking lots without building additional parking spaces. The objectives of the research were much broader than the determination of how well the subsidy program met the legislative objective of reducing parking demand. The emphasis was to provide transit management and planners with information about the characteristics which impact the travel decisions of these groups. The transit subsidy program was initiated in the State of Iowa. Employees throughout the state were provided an opportunity to purchase monthly passes on the local transit system at a 50 percent subsidy level during the first year and at a 25 percent subsidy level during a second year. This research evaluates the transportation, socioeconomic, and attitudinal characteristics of the participants and nonparticipants in the program. The effectiveness of the program in changing travel habits and the cost of the program are assessed. The most significant and consistent variable for discriminating between users and non-users was the attitudinal factor. Travel cost, the policy variable addressed by the subsidy, was not a dominant variable in any of the models. Discriminant analysis probability models are able to correctly classify approximately 80 percent of the employees. Transferability of the models between cities was checked by classifying employees in the cities other than the one in which the model was calibrated. Employee classifications were most comparable with models based on the attitudinal components. Approximately 45 percent of the users were auto drivers before the program. The savings from the potential reductions in parking demand could exceed the cost of the program. However, the demand is not uniformly reduced throughout the year. Recommendations are made to offer alternative pass or ticket forms in order to attract more employees to the program.

PB80-226475 PC **A11**/MF **A01**
California Univ., Irvine. Inst. of Tranportation Studies.
Shared Ride Taxi Services as Community Public Transit.
Final rept. 1 Sep 78-31 Jan 80,
Roger F. Teal, Gordon J. Fielding, Genevieve Giuliano, James V. Marks, and Richard E. Goodhue. Mar 80, 242p UMTA-CA-11-0017-80-2

This report examines the use of taxi firms as the providers of publicly supported demand responsive transit (DRT). The use of taxi firms as DRT providers raises a number of important institutional and performance issues. Accordingly, the primary purposes of this study are: (1) to analyze the issues associated with taxi firm provision of publicly sponsored community transit services, including the institutional reasons for contracting, competition for contracts, and contractual arrangements and their effects; and (2) to evaluate the performance of taxi-based community transit systems and the consequences for taxi firms becoming public transit providers, including legal implications, operational changes, labor-management relations, impact of subsidization, and effects of contracting on the firm's financial situation and future plans. Shared ride taxi (SRT) performance is evaluated in terms of cost-efficiency and effectiveness, and is also compared to that achieved by other forms of community level transit.

PB80-226509 PC **A08**/MF **A01**
General Motors Technical Center, Warren, MI. GM Transportation Systems Div.
Systems Operation Studies for Automated Guideway Transit Systems: Classification and Definition of AGT (Automated Guideway Transit) Systems.
Final rept. Jun 76-Jun 79,
R. A. Lee, and F. S. A. Alberts. Feb 80, 165p DOT-TSC-UMTA-79-50, UMTA-MA-06-0048-80-3
Contract DOT-TSC-1220
See also report dated Apr 80, PB80-193386.

The report describes the development of an AGT classification structure. Five classes are defined based on three system characteristics: service type, minimum travelling unit capacity, and maximum operating velocity. The five classes defined are: Personal Rapid Transit (PRT); Small Vehicle Group Rapid Transit (SGRT); Intermediate Vehicle GRT (IGRT); Large Vehicle GRT (LGRT); and Automated Rail Transit (ART). All classes except LGRT and ART are further stratified on the basis of speed, resulting in a total of eight subclasses. Forty-four existing and proposed AGT systems are summarized and used to define ten representative systems in terms of nominal values and ranges of selected characteristics. A summary of the system information compiled and used to complete this task is presented in Appendix A of this report. This report also provides a bibliography, list of text references, and a glossary of terms.

PB80-226517 PC **A05**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
Identification of Variables Affecting Driver Seated Position.
Final rept. 1 Jul 78-30 Jun 79,
Lawrence W. Schneider, Paul L. Olson, Charles K. Anderson, and David V. Post. Nov 79, 76p UM-HSRI-79-47

A sample population of 51 male and 57 female subjects ranging in age from 18 to 78 years was assembled and tested in six different vehicles for preferred seat positions under non-driving and driving conditions. Volunteer subjects were selected by age, stature, and weight criteria in order to match the U.S. adult population to the extent practical. Analysis of these data suggest that on a total sample basis there is little difference between seat positions selected under non-driving and driving conditions, but that individuals may show significant differences. The small differences in group mean positions observed in this study may be due to a seat belt and/or an initial seat position factor. Post-drive seat position results were analyzed in a variety of ways to identify factors that may influence a person's preferred seat position.

PB80-226541 PC **A06**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).

Passenger Problems on Moving Buses.
B. M. Brooks, H. M. Edwards, C. R. Fraser, J. A. Levis, and M. A. Johnson. c1980, 103p TRRL-SUPPLEMENTARY-520

Phase II of the research on passenger problems on moving buses, undertaken by Leyland Truck and Bus under contract to the Transport and Road Research Laboratory, can be summarized under five headings: Handholds, Going to and from the seat, In the seat, Step height and retractable step, and Accidents. (Copyright (c) Crown Copyright 1980.)

PB80-226566 PC **A03**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Test Results of a Dodge Dart Equipped with the Holley Sonic Carburetor.
Dec 77, 32p EPA-AA-TAEB-77-14

Under EPA contract, the Holley Carburetor Division of Colt Industries developed an application of the Dresser Sonic Carburetor design for evaluation by EPA. The Holley Sonic Carburetor was tested for emissions and fuel economy in a 1975 California model Dodge Dart with a 3.7 litre (225 cu. in.) six cylinder engine. The test results were compared to those of the same vehicle in baseline condition (production carburetor and emission control system). Factors such as the air/fuel ratio, idle enrichment, and air injection were varied to optimize the emissions. After an optimum setting was found, the emissions were still generally higher than the same vehicle in baseline condition. Addition of a three way catalyst reduced NOx below baseline, but HC, fuel consumption, and especially CO values were still greater than baseline.

PB80-227630 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Emissions and Fuel Economy Tests of the University of Florida Hybrid Bus.
Technical rept.
Dec 77, 25p EPA-AA-TAEB-77-10

Several years ago the University of Florida began studies of hybrid vehicles under the sponsorship of the State of Florida Department of Transportation. Initially they designed and built a small gasoline-electric hybrid automobile. The program was later expanded to the design and construction of a hybrid diesel-electric bus with funding provided by UMTA for the demonstration phase of the project. Extensive testing of the bus was conducted over the last two years. The vehicle was also placed in service in Gainesville for a considerable part of this time. In January, 1977, UMTA asked EPA to conduct emission and fuel economy tests of the hybrid bus.

PB80-227929 PC **A06**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Cycling as a Mode of Transport.
c1980, 116p TRRL-SUPPLEMENTARY-540
Proceedings of a Symposium Held at Crowthorne, England on 25 October 1978. Prepared in cooperation with the Institution of Highway Engineers.

Contents: Cyclists' touring club centenary; Cycle use in Britain; Cycle safety; Legal aspects; Design criteria; Cycle routes in the Hague and Tilburg; Bikeway demonstration program -- an overview; Cycle routes in Peterborough. (Copyright (c) Crown Copyright 1980.)

PB80-227994 PC **A15**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
A Computerized Model for Simulating the Braking and Steering Dynamics of Trucks, Tractor-Semitrailers, Doubles, and Triples Combinations. User's Manual - Phase 4.
Final rept. 1 Jul 79-30 Jun 80,
Charles C. MacAdam, Paul S. Fancher, Garrick T. Hu, and Thomas D. Gillespie. 1 Sep 80, 350p UM-HSRI-80-58

This report contains the information needed to use a detailed, computerized model (called 'PHASE 4') for simulating the braking, directional, and/or braking performance of heavy trucks and combination vehicles. After concise discussions concerning (1) the history of the development of PHASE 4 and (2) the uses, operation, and validity of the computerized model, comprehensive descriptions of the required input data and the program output are provided to allow a user to submit a run and interpret the output obtained.

PB80-851371 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electric Automobiles. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Aug 80, 103p NERACIAANT0574
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information on the development of electric automobiles and various modes of transportation by electric vehicles. Sources of energy to accomodate the electric cars are also mentioned. (Contains 139 citations.)

PB80-852676 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Auto and Truck Suspension Systems. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 115p NERACEI NT0864
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains technical reports on automotive suspension systems and related components and performance. Steering systems, pneumatic or spring systems, front, and rear suspensions, leaf and coil springs, safety and handling, car and trucks, leveling systems, design and analysis, stress and vibration are typical technical subjects which are covered. (Contains 132 citations.)

PB80-852783 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Automotive Ignition Systems. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 110p NERACEI NT0865
Sponsored in part by National Technical Information Service, Springfield, VA.

Ignition systems for automobiles as covered in this bibliography does not include diesel ignition systems or ignitors. It includes articles on such topics as electronic ignition systems, microprocessors, spark plugs, ignition timing, distributors, spark characteristics and performance data. New experimental devices are covered and various side issues such as radiofrequency interference, ignition wires and results using various fuels. (Contains 117 citations.)

PB80-853393 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vehicle Traffic Control. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Aug 80, 37p NERACEDBNT0472
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, development and application of vehicle traffic control equipment and systems. Among the applications described are energy conservation through arterial improvements and improved traffic flow and the use of microprocessors for dynamic response to changing traffic levels. (Contains 028 citations.)

PB80-853401 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vehicle Traffic Control. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
William V. Sassi. Aug 80, 39p NERACIAANT0472
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, development and application of vehicle traffic control equipment and systems. Among the systems described are automatic vehicle monitoring systems for urban areas and the use of satellite systems for vehicle traffic control. (Contains 030 citations.)

PB80-853419 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vehicle Traffic Control. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 33p NERACEI NT0472
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, development and application of vehicle traffic control equipment and systems. Among the systems described are automatic vehicle location systems for railroad, analysis and planning of automobile handling and parking using computers and other automatic vehicle location devices and systems. (Contains 027 citations.)

PB80-857188 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electric Automobiles. September, 1978-May, 1980 (Citations from the Energy Data Base).
Rept. for Sep 78-May 80,
Walter Van Put. Aug 80, 187p NERACEDBNT0574
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the development of electric automobiles and various modes of transportation by electric vehicles. Citations include descriptions of sources of energy to accomodate the electric cars. (Contains 187 citations.)

PB80-857931 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Traction Drive Transmissions. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 26p NERACEI NT0339
Sponsored in part by National Technical Information Service, Springfield, VA.

As a means of replacing current gear and fluid transmissions with their various limitations, traction drive transmissions have continuously variable ratios and operate with high efficiency and low vibration. Recent developments have provided expectations of applications in automobiles and other higher power functions not previously workable. Various technological articles are included in this bibliography and describe current projects and developments. (Contains 020 citations.)

UCRL-52894 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Aluminum-Air Power-Cell System Design: Mass and Enthalpy Balance.
R. V. Homsy. 19 Dec 79, 93p
Contract W-7405-ENG-48

In designing an aluminum-air power cell for electric vehicle propulsion, a mass and enthalpy balance was performed on the galvanic cell stack and on each of the components required to support its operation. A computer program is presented, which calculates steady-state temperature, flow rate, and composition of all streams in the integrated power-cell system. The steady-state performance of the system was determined over a representative range of four operating variables: current density,

air-flow rate, environmental temperature, and crystallizer temperature. The power-cell system condenses water required for the operation of the cell from the exhaust of the air-cathode stream; the air-flow rate required for this operation is determined for a range of environmental temperatures. It is concluded that a vehicular power cell can operate satisfactorily at a temperature of 60 exp 0 C over extremes of driving cycles. It is also concluded that the reaction product may be stored most effectively on board the vehicle in the form of a water-washed, drained solid containing about 14% water. (ERA citation 05:030841)

13G. Hydraulic and Pneumatic Equipment

PB80-851397 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Hydraulic Shock Absorbers. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 148p
NERACEDBNT0618
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design, construction, and maintenance of hydraulic shock absorbers, or suppressors, for use in the dampening of vibration in nuclear power plants. (Contains 182 citations.)

PB80-853898 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Air Compressors. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 24p NERACUSGNT0581
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information is cited covering piston, screw and rotary air compressors. Design criteria of air systems and lubricants for air compressors are also included. (Contains 034 citations.)

PB80-854896 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pneumatic Tools. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 53p NERACIAANT0665
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on applications and development of pneumatic or air pressure to tools, devices and equipment in the transportation systems, medical, safety, electrical and fluidic controls, manufacturing and others. Design principles, lubricants and controls, manufacturing and others. Design principals, lubricants and noise control for pneumatic tools and devices are also discussed. (Contains 044 citations.)

PB80-854904 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pneumatic Tools. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 89p NERACUSGNT0665
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on applications and development of pneumatic or air pressure to tools, devices and equipment in the transportation systems, medical, safety, electrical and fluidic controls, manufacturing and others. Design principles, lubricants and controls, manufacturing and others. Design principals, lubricants and noise control for pneumatic tools and devices are also discussed. (Contains 068 citations.)

PB80-854912 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pneumatic Tools. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 116p NERACEI NT0665
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on applications and development of pneumatic or air pressure to tools, devices and equipment in the transportation systems, medical, safety, electrical and fluidic controls, manufacturing and others. Design principles, lubricants and noise control for pneumatic tools and devices are also discussed. (Contains 125 citations.)

PB80-854920 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pneumatic Tools. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 47p NERACEDBNT0665
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on applications and development of pneumatic or air pressure to tools, devices and equipment in the transportation systems, medical, safety, electrical and fluidic controls, manufacturing and others. Design principles, lubricants and controls, manufacturing and others. Design principals, lubricants and noise control for pneumatic tools and devices are also discussed. (Contains 035 citations.)

13H. Industrial Processes

AD-A088 015/3 PC **A11**/MF **A01**
Army Industrial Base Engineering Activity Rock Island IL
Manufacturing Methods and Technology. Project Summary Reports.
Semi-annual rept. Jan-Jun 80.
Jun 80, 246p

This report contains summaries of 112 projects that were completed under the Army's Manufacturing Methods and Technology (MMT) Program. The MMT program was established to upgrade manufacturing facilities used for the production of Army materiel. The summaries highlight the accomplishments and benefits of the projects and the implementation actions underway or planned. Points of contact are also provided for those who are interested in obtaining additional information. (Author)

AD-A088 076/5 PC **A06**/MF **A01**
Solar Turbines International San Diego CA
Isothermal Roll Forging of T55 Compressor Blades. Phase II.
Final rept. Feb 78-Jan 80,
Fred K. Rose, and Arthur G. Metcalfe. Jun 80, 118p SR80-R-4392-43, USAAVRADCOM-TR-80-F-12, AMMRC-TR-80-32
Contract DAAG46-76-C-0043
Prepared in cooperation with the Avco Lycoming Div. Report on Manufacturing Methods and Technology (MANTECH) Program. See also AD-A052 817.

The objective of Phase II of this manufacturing technology program was to produce the 2nd stage blade of the Avco T-55 engine for static evaluation using the isothermal roll forge process. Blades were produced in AM-350 alloy using two roll-forge passes of the energy efficient, microprocessor controlled process. The blades met the fatigue, tensile and metallurgical requirements of Avco specifications. (Author)

AD-A088 180/5 PC **A02**/MF **A01**
United Technologies Research Center East Hartford CT
Manufacture of Disks by the Hot Isostatic Pressing Process.
Brice N. Cassenti. 1980, 14p AFOSR-TR-80-0593
Contract F49620-78-C-0090
Pub. in Proceedings of the AIAA/SAE/ASME Joint Propulsion Conference (16th), 30 Jun-2 Jul 80. Paper no. AIAA-80-1111.

No abstract available.

AD-A088 208/4 PC **A07**/MF **A01**
United Technologies Research Center East Hartford CT
Analytical Modeling of the Hot Isostatic Pressing Process.
Final rept. 15 Jul 78-14 Jul 80,
Brice N. Cassenti, and K. J. Cheverton. Jul 80, 134p R80-944374-13, AFOSR-TR-80-0592
Contract F49620-78-C-0090

This report describes the results of a two-year investigation to develop a modeling strategy to predict the final shape of components manufactured by the Hot Isostatic Pressing (HIP) process. When a powder metal is subjected to the high pressures at high temperatures there is a permanent reduction in the macroscopic volume by approximately 30 percent. The volume reduction, which is not included in classical creep and plasticity theories, necessitates the modification of the classical theories. The major part of this report concerns development of a constitutive model for powder metals. A model for powder metals subjected to an external hydrostatic pressure has been developed and compares well with experimental results. The exact form oof the theory for a multi-axial stress state was determined by a series of mechanical tests. The constitutive model has been incorporated into the MACR nonlinear finite element computer program and analysis of an independent experiment using the modified code has been performed and verified the accuracy of the theory. Once the theory had been verified it was applied to the HIP of a disk and a sensitivity study was performed to determine an efficient modeling strategy. The results of the program are discussed in detail. (Author)

AD-A088 413/0 PC **A03**/MF **A01**
Army Armament Research and Development Command Dover NJ Large Caliber Weapon Systems Lab
Electro-Optical Inspection System for Packed M42/M46 Grenades.
Technical rept.,
Edward G. Kessler. Aug 80, 28p ARLCD-TR-79012, AD-E400 463

An in-house, experimental program was conducted to develop an electrooptical inspection system for use on M42/M46 grenades packed in M483 projectile bodies. Two distinct approaches to this problem are evaluated. The first approach, useful where the grenade orientation is known, is based on the use of fiberoptic proximity sensors which signal when grenade components have exceeded their allowable range of travel. The second approach, useful for random grenade orientation, is based on projecting a band light onto the grenade. From the apparent profile of the band, viewed from above, the grenade status can be inferred. Grenade condition is analyzed by microcomputer using input from carefully placed monitoring photodetectors. The program demonstrates a novel inspection system with good potential for development into a working factory model.

AD-A088 416/3 PC **A06**/MF **A01**
Michigan Univ Ann Arbor Dept of Mechanical Engineering
Automated Process Control for Machining (CAM).
Final rept.,
Joseph Datsko. Dec 79, 121p SARRI-EN-80-01
Contract DAAA06-78-C-0242

Turning cuts were made on 4140 steel at 200 and 290 Brinell hardness with HSS and carbide tools. Computer programs were prepared for both Fortran and hand-held computers to calculate the cutting speed for turning. The programs were based on a Fundamental Machinability Equation that includes the tool material and shape, the size of cut and size of the workpiece. Programs were also written for surface finish and horsepower requirements, and for time and cost analyses and control. Test applications demonstrated capabilities, in quickly and accurately controlling machining rates

for maximum production and/or minimum cost rates, far surpassing the use of contemporary handbook data and manual methods. (Author)

AD-A088 440/3 PC **A09**/MF **A01**
Solar Turbines International San Diego CA
Manufacturing Process Development for Dust and Rain Erosion Resistant Coated Metallic Clads for Helicopter Rotors.
Final rept. 5 Apr 76-30 Jun 80,
David P. Huey, and Alvin R. Stetson. Jun 80, 187p Rept no. SR80-R-4511-37
Contract DAAG46-76-C-0033
Report on Manufacturing Methods and Technology (MANTECH) Program.

Manufacturing processes for creating erosion resistant coatings on metallic rotor blade leading edges were optimized as a follow-on to a coating development program sponsored by AMMRC (Contract DAAG74-C-0054). Solide coated, titanum rotor nose caps were produced in sections up to 30 inches long. Commercially pure (A75) and alloyed (Ti-6Al-4V) titanium was used. Newly developed graphite coating mandrels made possible simultaneous coating and creep forming of titanium sheet material to accurate airfoil contours. Sand and rain erosion tests were performed along wh tensile, impact, salt spray and adhesive bonding tests. Costs per part for production quantities were estimated. Solide coated test specimens of titanium and SAE 430 stainless steel were provided to three major helicopter manufacturers for test and evaluation: Hughes, Sikorsky and Bell. Their conclusions were that Solide coatings are excellent in rain erosion resistance and low angle sand erosion resistance but do not meet minimum survival requirements when subjected to sand erosion by large particles (greater than 100 micrometer) impinging at high angles (greater than 45 degrees). (Author)

AD-A088 451/0 MF **A01**
Hughes Helicopters Culver City CA
Conventional Machining of ESR 4340 Steel.
Final rept. 1 Sep 78-1 Apr 80,
K. K. Niji. Jul 80, 117p HH-80-125,
USAAVRADCOM-TR-80-F-14, AMMRC-TR-80-34
Contract DAAG46-78-C-0046
Report on manufacturing methods and technology (MANTECH) program.
Availability: Microfiche copies only.

This program involved the study of conventional machining of heat treated ESR 4340 steel (Rc 54-57). Initial effort involved a survey of available data regarding the machining of high strength steels with hardnesses of Rc 50 and above. A machining program was conducted, determining optimum tools and conditions for turning, drilling, face milling, end milling, and grinding operations. Effects of various parameters includng cutting speeds, feeds, depths of cut, and cutting fluids on tool life was determined. All the operations were found to be extremely difficult and applicaton of conventional procedures is not feasible. Tool lives remained short despite reductions in speeds and feeds. Conventional grinding methods induced detrimental residual tensile stresses along the surface, resulting in cracking, lapping, and untempered martensitic structures. Low stress grinding techniques were found to be applicable to this material when proper dressing procedures and reduced rates were used. (Author)

AD-A088 539/2 PC **A04**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
A Mathematical Model for Production Simulation.
Technical rept.,
E. E. Coppola. Jul 80, 52p ARLCB-TR-80024, AD-E440 081

A mathematical model has been developed to simulate the production lines at Watervliet Arsenal. Inputs to the model include the steps required to transform raw material into a finished product and the resources available for production. From these data, the model will predict such things as the number of items produced by the line, utilization of machines and workers and areas where the number or quality of the resources are not adequate to meet the desired production goals.

AD-A088 542/6 PC **A03**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Electrodeposition of Tantalum and Tantalum-Chromium Alloys.
Technical rept.,
I. Ahmad, W. A. Spiak, and G. J. Janz. May 80, 37p ARLCB-TR-80014, AD-E440 082
Presented at Annual Meeting of AIME, 24-28 Feb 80, Las Vegas, NV.

A part of a program to develop erosion resistant coatings for advanced gun barrels, electrodeposition of tantalum and tantalum-chromium alloys from fused FLINAK (eutectic mixture of LiF-KF-NaF) has been investigated. Tantalum-chromium alloys containing 2-6% chromium were obtained by codepositing tantalum and chromium from an electrolyte containing 10 wt% TaF5(added as K2TaF7) and 0.5-1.5% Cr (added as CrF3), at 800 C and 15-40 ma/sq cm current density. The alloy coatings were smooth and columnar in structure. The microhardness of these coatings increased with the increase of chromium content.

AED-Conf-77-415-002 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Datenverarbeitung in der Technik.
Low-Cost System for Graphical Process Monitoring with Color Video Symbol Display Units.
H. Grauer, V. Jarsch, and W. Mueller. 1977, 4p CONF-7709171-1
In German.Annual congress of the Gesellschaft fuer informatik e.v. Nuernberg, F.R. Germany, 26 Sep 1977.
U.S. Sales Only.

A system for computer-controlled graphic process supervision using color symbol video displays is described. It has the following characteristics: compact unit: no external memory for image storage, problem oriented simple descriptive cut to the process program, no restriction of the graphical representation of process variables; computer and display independent, by implementation of colors and parameterized code creation for the display. (Atomindex citation 09:399137)

BDX-613-2275 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Electrochemical Form Grinding. Fnal Report.
R. W. Stiles. Jun 80, 23p
Contract AC04-76DP00613

Electrochemical form grinding cutting tests were performed on 25 17-4 PH stainless steel bars by a copper resin aluminum oxide wheel formed from a diamond form block. Tests investigated methods of dressing a form into a grinding wheel, nozzle design, optimum machine settings, and tolerance capabilities. The electrolyte was distributed evenly onto the wheel by a form-fitting nozzle, and a minimum of two passes, rough and finish, were made because of current density variations throughout the cut. Tolerance held on the form test samples was +- 0.12 mm on the contour, with an average 0.12 mm overcut. (ERA citation 05:030845)

BDX-613-2382 PC **A05**/MF **A01**
Bendix Corp., Kansas City, MO.
Deburring: Technical Capabilities and Cost-Effective Approaches. Lessons 5 and 6.
L. K. Gillespie. Jun 80, 90p
Contract AC04-76DP00613

The ten-lesson text on deburring is designed to provide engineers and production supervisors with an overall understanding of deburring economics and current capabilities. Lessons 5 and 6 show that the effective plant-wide reduction of deburring costs can best be achieved by: determining the people who should be involved in a plant-wide review of deburring; defining the approach to be used in a plant-wide review of deburring; providing some form of training for both engineers and production workers; establishing in-plant standards for burrs and deburring; and understanding the capabilities of the available deburring equipment. The key to plant-wide control of deburring costs lies in considering deburring as integral as drilling or milling to the manufacturing process, in respecting the difficulty that deburring presents, in recognizing those who contribute to the success of deburring operations, and in using the large quantity of data that already exists. Plant-wide control of deburring costs is the difference between 25 years of experience and one year of experience repeated 25 times. (ERA citation 05:031023)

BDX-613-2442 PC **A03**/MF **A01**
Bendix Corp., Kansas City, MO.
Effects of Xenon Cover Gas in CO sub 2 Laser Welding.
T. L. Hendrix. Jul 80, 31p
Contract AC04-76DP00613

Weld spatter in CO sub 2 laser welding is detrimental to miniature components. The effects of using xenon gas as an inert laser welding atmosphere to reduce weld spatter are discussed. The laser plume characteristics, weld penetration, and weld spatter are evaluated. (ERA citation 05:030846)

BDX-613-2444 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Ultrasonic SEAM Welding. Final Report.
G. S. Darner. Jun 80, 22p
Contract AC04-76DP00613

Ultrasonic seam welding has been evaluated for making continuous seam welds on aluminum and copper-foil conductors. A seam welding system has been designed and fabricated, weldable material combinations have been identified, and the process parameters for welding materials applicable to flat cable production have been established. (ERA citation 05:030847)

BDX-613-2448 PC **A03**/MF **A01**
Bendix Corp., Kansas City, MO.
Laser Applications. Final Report.
R. T. Horn. Jul 80, 45p
Contract AC04-76DP00613

Processes were developed that use lasers as manufacturing tools. These processes were stripping of insulation from cables and wires, machining of quartz, microdrilling and welding of reflective metals, and precision alignment of curved surfaces before machining. A technological basis also was formed which resulted in a process for automatic surface inspection of parts and aided development of machining processes for Kevlar parts. (ERA citation 05:031061)

CEA-CONF-4581 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Metallurgie.
Vacuum Atomization of Powder and Shaping of Net-Shape Components of Molybdenum.
J. Devillard. 1979, 14p CONF-7903122-1
In French.International conference on new horizons in materials in India II metallurgy of tungsten and molybdenum, Hyderbad, India, 6 Mar 1979.
U.S. Sales Only.

The paper reports an electron beam process and furnace for the production of spherical molybdenum powders of varying particle size prepared by vacuum atomization. Technical parameters of this process are discussed in an industrial plant. Powders of molybdenum alloys were extruded into round bars and tubes and the conditions of extrusion are specified. The mechanical properties in the as extruded state and after recrystallization were found to depend on the interstitial elements content and the particle size of the powder used. Tubes were cold bent to a 5 cm radius of curvature before or after uncanning. In the as-extruded state the tubes have a ligneous surface, the roughness depends on the particle size of the powder used. A new step of development in shaping molybdenum tubes is investigated and the cost of this process in an industrial plant is discussed. (Atomindex citation 11:507954)

ECN-76 PC **A11**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Brazing. Compilation of Literature References from 1973 to 1978.
J. C. Roemer. Oct 79, 236p
U.S. Sales Only.

This report is a compilation of publish d literature on high temperature brazing covering the period 1973-1978. The references are listed alphabetical-

ly with regard to the base material or combination of base materials to be brazed. Trade names are treated as base materials. The report contains approximately 1500 references, of which 300 are to patents. (Atomindex citation 11:508593)

JINR-8-10477 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods.
Experimental Study on the HGU-250/4.5 Cryogenic Helium Facility.
A. I. Ageev, V. F. Burinov, Yu. V. Muratov, V. I. Pryanichnikov, and N. B. Rubin. 1977, 12p
In Russian.
U.S. Sales Only.

The results of an experimental investigation into a serial cryogenic helium installation KhGU-250/4.5 are presented. The installation is designed both for producing liquid helium in the amount of 90 l/h. and for cryostating objects with cold-production up 250 W. Preliminary nitrogen cooling conditions are proposed and realized, which makes it possible to increase the cold-production up to 340 and 470 W and the cooling rate up to 104 and 120 l/h., the installation efficiency increasing by a factor 1.2 - 1.3. The modernization of the installation makes it possible to realize combined modes in the entire control range. (Atomindex citation 09:408347)

KEK-78-28 PC **A03**/MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Processing a Fine Slit by Means of Electric Discharge.
S. Kasahara, H. Inoue, and T. Hongo. Mar 79, 28p
In Japanese.
U.S. Sales Only.

Among fabrication methods using electricity, the electric discharge processing is widely used for fabrication of forms and dies. If one notes however features proper to the electric discharge processors and minds their effective utilization, it is possible to fabricate pieces of very special shapes or of high precision as such. This paper reports on our trial to process a fine slit by means of electric discharge, whose fabrication is impossible by the conventional methods. (Atomindex citation 11:509209)

N80-29599/1 PC **A04**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Inst. of Semiconductor Electronics.
Automated High Resolution Electron Beam Lithography: Basic Investigations on Physics and Alignment of Semiconductor Microstructures.
Final Report.
H. J. Geelen, D. Leers, B. Meusemann, and D. Stephani. Dec 79, 68p BMFT-FB-T-79-69, ISSN-0340-7608
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A computer controlled lithographic method for the etching of microcircuits onto a silicon wafer was studied and optimized. The direct exposure electron beam microfabricator adopted, as well as the modifications which were made in hardware and software in order to fulfill the requirements of direct material removal and alignment for multilevel devices are described. In addition, the automatic alignment algorithm, the development of appropriate reference marks, the behavior of different types of resists, and calculations according to the Monte Carlo model of backscattered electrons and their influence on process precision are presented.

PB80-208630 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC.
Guidelines for Exchangeable APT Data Packages. Automation Technology Program.
Final rept.,
Bradford M. Smith. Jun 80, 18p NBSIR-80-2073
Sponsored in part by Sacramento Air Logistics Center, McClellan AFB, CA.

A method of APT programming and postprocessor design is described which permits more efficient data preparation for numerical control (NC) machine tools and then allows this data to be quickly and easily exchanged among different NC machines. A rigorous specification is made of the APT postprocessor language based upon new ANSI standards for APT and is coupled with a comprehensive definition of the machining functions which should result from the use of each APT language statement. Individual postprocessors are modified to process each statement in the same manner. Thus, the original intent of the part programmer is always satisfied. A 23% increase in NC manufacturing efficiency is projected. The approach is demonstrated in production by processing a single APT data package on three different milling-drilling type machine tools. This Final Report details the approach taken and the benefits measured.

PB80-223993 PC **A02**/MF **A01**
Electricity Council Research Centre, Capenhurst (England).
Electrohydraulics-A Review of the E.C.R.C. Research Programme 1970-1977.
D. Simpson. May 80, 25p ECRC/R1336

The scope and progress of the Electricity Council's Research program on Electrohydraulics (the use of underwater electrical discharges) is described. The most promising area found is the use of shock waves generated by the electrohydraulic discharge to improve the mixing and contact area between small gas bubbles and a liquid. This mechanism is of great importance in industrial chemical reactors, however, further tests of this process using a reaction which is relevant to the particular requirements of a chemical company are required.

PB80-850415 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Brazing and Soldering Aluminum. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jul 80, 63p NERACUSGNT0304
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the processes involved in brazing and soldering aluminum alloys and composites. Also included is the application of these processes to SST technology, titanium brazing, and soldering aluminum in transistors. (Contains 051 citations.)

PB80-850423 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Brazing and Soldering Aluminum. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jul 80, 69p NERACEI NT0304
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the processes involved in brazing and soldering aluminum. Among the techniques discussed are ultrasonic and high-speed ultrasonic soldering, fluxless brazing, high-temperature brazing, diffusion brazing, and vacuum brazing. Also included in the bibliography is a discussion of the application of these techniques to such areas as the production of aluminum heat exchanges. (Contains 080 citations.)

PB80-850480 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Drawing Steel. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 157p NERACEI NT0332
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the techniques and processes involved in drawing steel into strips, sheets, and wires. Some of the citations discuss the metallurgical characteristics of drawn steel and the application of this data in the determination of drawing defects. (Contains 160 citations.)

PB80-850597 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Hot Isostatic Press. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 85p NERACEI NT0297
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles discuss the various applications of hot isostatic presses to such processes as densification of castings, pressing of cemented carbides, etc. Some abstracts also cover the construction of isostatic presses, as well as some hot isostatic press products. (Contains 019 citations.)

PB80-850647 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Drawing Plastics. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 33p NERACEI NT0329
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations presented in this bibliography cover deep and cold drawing of plastics or polymeric sheets, strips, rods, and wire. Plastic deformation by rolling and drawing, analysis of internal stresses, and assessing plastic anistropy from cup drawing are also included in this bibliography. (Contains 028 citations.)

PB80-850662 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Stainless Steel Finishing. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jul 80, 30p NERACEI NT0334
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the methods and equipment used in polishing and finishing stainless steel. Among the methods described are the use of high temperature water, immersion in acid solutions, and electrolytic polishing. (Contains 027 citations.)

PB80-850746 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Soldering Electronics. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
T. David Kennedy. Jun 80, 56p NERACIAANT0278
Sponsored in part by National Technical Information Service, Springfield, VA.

Unlike the soldering of typical mechanical components and assemblies, connections and joints soldered in electrical equipment have unique requirements such as small size, damage from heating, integrity of electrical conductivity, electrical leakage from flux residue, mechanical reliability in environments of heating and cooling cycles, high vibration, etc. The articles listed cover a broad range of assembly and test information as well as various techniques and technical data. (Contains 100 citations.)

PB80-850753 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Soldering Electronics. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 177p NERACEI NT0278
Sponsored in part by National Technical Information Service, Springfield, VA.

Unlike the soldering of typical mechanical components and assemblies, connections and joints soldered in electrical equipment have unique requirements such as small size, damage from heating, integrity of electrical conductivity, electrical leakage from flux residue, mechanical reliability in environments of heating and cooling cycles, high vibration, etc. The articles listed cover a broad range of

assembly and technical data. (Contains 150 citations.)

PB80-850761 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Separation of Materials. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 92p
NERACUSGNT0336
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography covers the design, development and testing of equipment which used magnetism as a means of separating magnetic materials from nonmagnetic. This technology is used extensively in cleaning fossil fuels, separating particles from fly ash, scrap metal recovery, benefication of various ores and in processing municipal and other wastes. The articles presented describe various operating systems and separating techniques. Design data and performance parameters are given for both dry and fluid systems. (Contains 075 citations.)

PB80-850795 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Deburring. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 127p NERACEI NT0336
Sponsored in part by National Technical Information Service, Springfield, VA.

An essential element in the manufacture of many metal and plastic parts is the prevention and/or removal of burrs which form during machining, casting and other fabricating operations. Methods considered in this collection of articles for removing burrs include grinding, electrochemical machining, buffing, abrasive blasting, tumbling, high pressure water jets, microdeburring, vibratory deburring and many others. Methods to present burrs are covered as is the economics of various deburring techniques. (Contains 125 citations.)

PB80-850902 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Drawing Aluminum. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 45p NERACEI NT0302
Sponsored in part by National Technical Information Service, Springfield, VA.

The articles cited in this bibliography describe the latest techniques and processes of drawing aluminum into strips, sheets, wire, and containers. Also included are articles describing specialized drawing for military and aviation applications. (Contains 040 citations.)

PB80-850993 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrostatic Painting. September, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Sep 70-Jun 80,
Howard L. Ogushwitz. Aug 80, 175p NERACEI NT0285
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles discuss the industrial and commercial use of electrostatic painting. Methods of applying electrostatic paints and coatings as well as a description of currently available devices for such application are also cited. (Contains 200 citations.)

PB80-851165 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Anodizing Aluminum. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
William V. Sassi. Aug 80, 177p
NERACIAANT0485
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the metallurgical processes involving the anodizing of aluminum. Also included are the welding applications of aluminum anodizing to the solar energy and the aircraft industry. (Contains 052 citations.)

PB80-851686 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ultrasonic Welding. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 66p
NERACIAANT0694
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography contain a discussion of the method and application of ultrasonic welding in metals, polymers, electrical terminations, etc. (Contains 043 citations.)

PB80-851785 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Continuous Metal Casting. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 112p NERACEI NT0579
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide research and development is cited on various metals and alloys continuous casting. Die casting, precision casting, equipment and material handling are also discussed. (Contains 117 citations.)

PB80-851926 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Extrusion of Polystryrenes, Polypropylenes, and ABS Resins. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 74p NERACEI NT0927
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the extrusion of polystyrenes, polypropylene and ABS plastics, using various extrusion equipment. Chemical, mechanical and physical properties of the extruded materials, are also discussed. (Contains 061 citations.)

PB80-852643 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Soldering Electronics. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 89p
NERACUSGNT0278
Sponsored in part by National Technical Information Service, Springfield, VA.

Unlike the soldering of typical mechanical components and assemblies, connections and joints soldered in electrical equipment have unique requirements such as small size, damage from heating, integrity of electrical conductivity, electrical leakage from flux residue, mechanical reliability in environments of heating and cooling cycles, high vibration, etc. The articles listed cover a broad range of assembly and technical data. (Contains 095 citations.)

PB80-852791 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rolling Mill Automation and Control Systems. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 160p NERACEI NT0867
Sponsored in part by National Technical Information Service, Springfield, VA.

With constant demand for quality control, high volume reproduction and cost economy, rolling mills for metal products have achieved a high degree of automation and control systems. Technical articles in this bibliography are not limited to any particular metal or product line so that the reader may obtain technology ideas from related applications. Included are articles dealing with computer controls, control methods, measurement techniques, mechanical apparatus, electrical equipment, instrumentation and models. All rolling mill equipment is applicable to the processes hot or cold, continuous, heating furnaces or auxiliary equipment. (Contains 200 citations.)

PB80-853351 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Anodizing Aluminum. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 43p
NERACUSGNT0485
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the processes involving the anodizing of aluminum. Also included is a discussion of the various methods of anodizing, as well as the application of such anodizing to the surface finishing. (Contains 031 citations.)

PB80-853542 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Heat Treatment of Gears. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 43p NERACEI NT0834
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the process of heat treatment for the hardening of gears. Among the different types of gears discussed are steel, carbon steel, and nickel-caromium-molybdenum carburizing steel gears. (Contains 033 citations.)

PB80-853583 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Robot Welding. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 49p NERACEI NT0759
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the design, production, and application of various types of industrial robots and teleoperators. Also included is and analysis of robots currently in use for welding and other assembly line applications. (Contains 047 citations.)

PB80-853914 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Flame Spraying. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 99p NERACIAANT0619
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and processes involved in plasma or flame spraying of metals. Also discussed are the application of this technique to the strengthening of metals and the production of space age materials. (Contains 095 citations.)

PB80-853922 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Flame Spraying. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 40p
NERACEDBNT0619

Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and processes involved in plasma or flame spraying of metals. Also discussed are the application of this technique to the strengthening of metals and the production of space age materials. (Contains 031 citations.)

PB80-854094 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Isostatic Pressing. June, 1974-May, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 61p NERACEI NT0654
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover worldwide information on isostatic pressing of large or small parts, using powder metals, alloys, titanium alloys, hard metals, and high performance metals. The influence of isostatic hot pressing on the mechanical and physical properties of the metals are also discussed. (Contains 048 citations.)

PB80-854821 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fine Grinding. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 39p NERACEI NT0850
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe various methods and equipment used for fine grinding. Among the ground materials discussed are crystalline materials, powder alloys, and rubber using such grinding methods as stirred ball milling, and grained diamond wheel grinding. (Contains 038 citations.)

PB80-854847 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Manufacturing Materials Handling. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 93p
NERACUSGNT0859
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the methods and machinery used in the handling, assembly, and fabrication of manufacturing and production materials. (Contains 050 citations.)

PB80-855737 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Cutting. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 100p NERACEI NT0662
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information are cited on plasma cutting of metals, alloys, carbon, stainless steel and others. Cumputerized, underwater, high pressure plasma cutting are also included. (Contains 139 citations.)

PB80-855844 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Welding. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jul 80, 61p NERACIAANT0663
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide research and applications of plasma welding techniques are cited. Automation, underwater welding and microwelding, using the plasma welding techniques are also included. (Contains 057 citations.)

PB80-855851 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Welding. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 165p NERACEI NT0663
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide research and applications of plasma welding techniques are cited. Automation, underwater welding and microwelding, using the plasma welding techniques are also included. (Contains 189 citations.)

PB80-857022 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plastics Blow Molding. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Aug 80, 181p NERACEI NT0269
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on research and development of blow molding of various thermo-plastics. Articles on different blow molding techniques, blow mold making and blow molding equipment are also included. (Contains 143 citations.)

PB80-857204 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Assembly Line Techniques. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 83p NERACEI NT0626
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the procedures involved in improving assembly line efficiency, as well as an analysis of various types of assembly lines and their production techniques. Also included is a discussion of assembly line balancing, scheduling, and repairs. (Contains 077 citations.)

PB80-857212 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Assembly Line Techniques. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 75p
NERACUSGNT0626
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the procedures involved in improving assembly line efficiency, as well as an analysis of various types of assembly lines and their production techniques. Also included is a discussion of assembly line design, testing, and computerization. (Contains 050 citations.)

PB80-857220 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Compression Molding. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Aug 80, 91p NERACEI NT0582
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide reports are cited on compression molding techniques. Thermosets, reinforced plastics and web making for compression molding are also included. (Contains 055 citations.)

PB80-857246 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrochemical Machining. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 108p NERACIAANT0573
Sponsored in part by National Technical Information Service, Springfield, VA.

Developments and applications are cited of electrochemical machining of steel, metals, alloys, carbides, borides and others. Electrochemical deburring, grinding, polishing and milling are also included. (Contains 068 citations.)

PB80-857253 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrochemical Machining. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 53p NERACUSGNT0573
Sponsored in part by National Technical Information Service, Springfield, VA.

Developments and applications are cited of electrochemical machining of steel, metals, alloys, carbides, borides and others. Electrochemical deburring, grinding, polishing and milling are also included. (Contains 047 citations.)

PB80-857261 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrochemical Machining. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 119p NERACEI NT0573
Sponsored in part by National Technical Information Service, Springfield, VA.

Developments and applications are cited of electrochemical machining of steel, metals, alloys, carbides, borides and others. Electrochemical deburring, grinding, polishing and milling are also included. (Contains 092 citations.)

PB80-857444 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Heat Treatment of Metals. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jun 80, 173p NERACIAANT0643
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information covering heat treatment of metals are cited. Annealing, normalization, quenching, tempering, hardening and hot quenching of steel and alloys, as well as physical properties, are also included. (Contains 125 citations.)

PB80-857451 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Heat Treatment of Metals. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 222p
NERACEDBNT0643
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information covering heat treatment of metals are cited. Annealing, normalization, quenching, tempering, hardening and hot quenching of steel and alloys, as well as physical properties, are also included. (Contains 114 citations.)

PB80-857477 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plating on Plastics. January, 1972-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 72-Jun 80,
Lawrence H. Marcus. Jun 80, 131p NERACEI NT0508
Sponsored in part by National Technical Information Service, Springfield, VA.

The reports cover literature dealing with the plating, electroplating and electroless plating of materials onto plastics, including metallization techniques. Decoration of plastics is included. (Contains 200 citations.)

PB80-857485 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Plating on Plastics. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 14p
NERACUSGNT0508
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which deal with plating or electroplating on plastics. (Contains 043 citations.)

PB80-858053 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Quality Control Methods. July, 1975-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jul 75-Jun 80,
William V. Sassi. Jun 80, 197p NERACEI NT0356
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the methods, techniques, and applications of quality control in industry. Also included is an analysis of the quality control systems in use in such industries as the electronics, automotive, and computer industry. (Contains 189 citations.)

PB80-858061 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Quality Control Methods. October, 1977-May, 1980 (Citations from the Energy Data Base).
Rept. for Oct 77-May 80,
William V. Sassi. Jun 80, 209p
NERACEDBNT0356
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the methods, techniques, and applications of quality control in industry. Also included is an analysis of the quality control systems in use in such industries as the electronics, automotive, and computer industry. (Contains 200 citations.)

PB80-858095 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Quality Control Methods. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 122p
NERACIAANT0356
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the methods, techniques, and applications of quality control in industry. Also included is an analysis of the quality control systems in use in such industries as the electronics, automotive, and computer industry. (Contains 104 citations.)

PB80-858103 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Quality Control Methods. February, 1976-June, 1980 (Citations from the NTIS Data Base).
Rept. for Feb 76-Jun 80,
William V. Sassi. Jun 80, 239p
NERACUSGNT0356
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the methods, techniques, and applications of quality control in industry. Also included is an analysis of the quality control systems in use in such industries as the electronics, automotive, and computer industry. (Contains 200 citations.)

PB80-858111 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Etching Technology. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 19p NERACEI NT0309
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography review the latest technological advances in the field of etching on steel, ceramics, lead, etc. Also included in these citations is a description of the various methods used, such as plasma etching, ironic etching, and steady state regenerative etching. (Contains 011 citations.)

PB80-858129 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Etching Technology. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 21p NERACIAANT0309
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography review the latest technological advances in the field of etching on various surfaces, for the production of solar cells, transistors, and other semiconductor devices. Also included in these citations is a description of the various methods used, such as cathode sputtering and chemical etching. (Contains 015 citations.)

PB80-858137 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Etching Technology. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 34p
NERACUSGNT0309
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography review the latest technological advances in the field of of etching on various surfaces. Also included in these citations is a descripton of the various methods used, such as electron beam etching and ion sputtering. (Contains 023 citations.)

PB80-858145 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Drawing Steel. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
William V. Sassi. Aug 80, 16p NERACIAANT0332
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the techniques and processes involved in drawing steel into strips, sheets, wires, etc. Also included in a few citations is a discussion of the metallurgical characteristics of drawn steel and the application of this data in the determination of drawing effects. (Contains 014 citations.)

PB80-858160 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Drawing Steel. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 25p
NERACEDBNT0332
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the techniques and processes involved in drawing steel into strips, sheets, wires, etc. Also included in a few citations is a discussion of the metallurgical characteristics of drawn steel and the application of this data in the determination of drawing effects. (Contains 016 citations.)

PB80-858624 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Heat Treatment of Metals. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 215p NERACEI NT0643
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information covering heat treatment of metals are cited. Annealing, normalization, quenching, tempering, hardening and hot quenching of steel and alloys, as well as physical properties are also included. (Contains 163 citations.)

PB80-859358 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Thermoset Molding Techniques. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 86p NERACEI NT0272
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information covering the different thermoset molding techniques. Topics on reaction injection molding, liquid reaction molding, liquid injection molding, reaction liquid injection molding, reactive liquid polymer and resin transfer molding are included. (Contains 078 citations.)

PB80-859382 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Plastics Injection Molding. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Aug 80, 206p NERACEI NT0268
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide reports are cited on injection molding of plastics. Topics on machinery, mold design, molding techniques, energy conservation, properties of injection molding plastics and computerized control of injection molding are included. (Contains 156 citations.)

PB80-859572 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Diamond Cutting and Polishing. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 66p NERACEI NT0576
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on the use of diamonds in cutting and polishing of hard substrates. Various techniques, tools, and machinery using diamonds are discussed. (Contains 056 citations.)

PB80-859796 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Ultrasonic Welding. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 70p
NERACUSGNT0694
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography contain a discussion of the method and application of ultrasonic welding in composites, plastic lubricants, and molybdenum disulfide. (Contains 058 citations.)

PB80-859937 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Materials Handling in Manufacturing. June, 1970-June, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 44p NERACIAANT0859
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations presented in this bibliography cover new technologies in manufacturing, methods of production, and methematical models. A recently developed method for improving the various proc-

essing steps in the fabrication of double base rocket propellants, and computerized manufacturing systems are also included. (Contains 050 citations.)

13I. Machinery and Tools

AD-A088 131/8 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario) Dept of Mechanical Engineering
Performance Characteristics of a Ker-Train Transmission,
L. F. Daws, and R. J. Ferguson. 1979, 4p DRB-REPRINT-4247
Abstract in French.
Availability: Pub. in Proceedings of the World Congress on Theory of Machines and Mechanisms (5th), v1 p751-754 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 132/6 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario) Dept of Mechanical Engineering
Measurement of Dynamic Transmission Errors in Non-Circular Gearing,
P. Bussieres, L. F. Daws, and R. J. Ferguson. 1979, 5p DRB-REPRINT-4246
Availability: Pub. in Proceedings of the World Congress on Theory of Machines and Mechanisms (5th), v1 p161-165 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 133/4 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario) Dept of Mechanical Engineering
Bevel-Carrier Logic in a Variable-Ratio Transmission (Transmissions aux Engrenagers Non-Circulaires et Rapport de Vitesse Variable Infiniment),
J. H. Kerr, and R. J. Ferguson. 17 Dec 76, 10p DRB-REPRINT-4249
Abstract in French.
Availability: Pub. in Mechanism and Machine Theory, v15 p19-28 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 134/2 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario) Dept of Mechanical Engineering
An Infinitely-Variable Vehicle Transmission Using Non-Circular Gears,
J. H. Kerr, and R. J. Ferguson. 21 Dec 78, 5p DRB-REPRINT-4245
Availability: Pub. in Transactions of the CSME, v5 n4 p187-191 1978-1979 (No copies furnished by DTIC/NTIS).

No abstract available.

EPRI-CS-1445 PC **A04**/MF **A01**
Energy Research and Consultants Corp., Morrisville, PA.
Centrifugal Pump Hydraulic Instability. Final Report.
E. Makay. Jun 80, 72p

The principal objective was to define the causes of hydraulic instability in boiler feed pumps, explain their origins, and relate them to the geometries of a pump stage (e.g., inlet, impeller, diffuser or volute...). The approach is to examine the influence of each component of pump geometry on the flow path and flow mechanisms and thus estimate the magnitudes and directions of hydraulically-induced forces on a pump rotor which influence dynamic response, pump performance, and critical speeds. The techniques and results of experiments on pump hydraulic forces are described and assessed to explain common frequency ranges. A method is developed for calculating radial hydraulic forces in a pump. The hydraulic mechanisms at work are listed, described, and related in turn to specific elements of pump stage geometry. Forces for the case in which the impeller is replaced with a solid mass are estimated. Recommendations are given for future work to measure and characterize the forces in various types of pump geometry. Two important findings are: (1) feedwater pumps must be designed for stable operation over the full range of possible flow rates, even at the cost of some reduction of efficiency at Best Operating Point; and (2) the complexities of flow within a pump stage are so great that every new design must be tested to determine its dynamic and performance characteristics over the full flow range. (ERA citation 05:030598)

N80-29706/2 PC **A20**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Rotordynamic Instability Problems in High-Performance Turbomachinery.
1980, 463p NASA-CP-2133, E-413
Conf. Held at College Station, 12-14 May 1980; Sponsored by Texas a and M Univ., Louisville Univ., and Arod.

No abstract available.

N80-29734/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Lubrication of Optimized-Design Tapered-Roller Bearings to 2.4 Million Dn.
R. J. Parker, and S. I. Pinel. Aug 80, 18p NASA-TP-1714, E-270
Sponsored in Part by Industrial Tectonics, Inc., Compton, Calif.

The performance of 120.65 mm (4.75 in.) bore high speed design, tapered roller bearings was investigated at shaft speeds to 20,000 rpm (2.4 million DN) under combined thrust and radial load. The test bearing design was computer optimized for high speed operation. Temperature distribution bearing heat generation were determined as a function of shaft speed, radial and thrust loads, lubricant flow rates, and lubricant inlet temperature. The high speed design, tapered roller bearing operated successfully at shaft speeds up to 20,000 rpm under heavy thrust and radial loads. Bearing temperatures and heat generation with the high speed design bearing were significantly less than those of a modified standard bearing tested previously. Cup cooling was effective in decreasing the high cup temperatures to levels equal to the cone temperature.

PAT-APPL-6-163 000 PC **A02**/MF **A01**
Department of the Navy Washington DC
High-Agility Reflector Support and Drive System.
Patent Application,
James W. Titus. Filed 25 Jun 80, 14p AD-D007 416/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus for positioning a device such as an antenna, mirror or flat reflector, the latter defining a mounting plane which is selectively rotatable about mutually perpendicular axes with respect to a base member defining a base plane. The base and mounting planes are characterized by a respective set of four suspension points lying in each plane. The two sets of suspension points are arranged in like geometric symmetry and define rhombi lying in each of the planes. Four support arm members join the base and mounting planes and are terminated at opposed pairs of suspension points in the planes. Each support arm member includes a linear actuator and has upper and lower joints at its respective ends. A gimbal having a longitudinal rotation axis is rotatably mounted to the mounting plane such that the longitudinal rotation axis of the gimbal passes through the upper joints associated with one pair of diagonally opposite support arm members. A pin is fitted transversely to the gimbal and is rotatably mounted to the base plane such that the longitudinal rotation axis of the pin passes through the upper joints associated with the other pair of diagonally opposite support arm members when the base and mounting planes are parallel. The apparatus is driven by simultaneously increasing the length of one of the linear actuators in a diagonally opposite pair while diminishing the length of the other linear actuator in the diagonally opposite pair. (Author)

PATENT-4 212 690 Not available NTIS
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Heat Treat Fixture and Method of Heat Treating.
Patent,
C. S. Beuyukian, R. M. Heisman, C. C. Haynie, and E. P. Ruppe. Filed 23 Mar 79, patented 15 Jul 80, 4p N80-28492/0, PAT-APPL-6-023 501 Supersedes PAT-APPL-6-023 501, N79-25197 (17 - 16, p 2104). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A heat treating fixture is disclosed in which the shape of the metal specimen is maintained by cold rolled steel support plates. Glide sheets of stainless steel, coated with boron nitride, in contact with each face of the metal specimens, allow for lateral expansion of the metal specimens without binding. Grooved support bars separate the glide sheets from the upper and lower support plates and allow flow of quenching fluid to the metal specimen.

PB80-850530 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Anti-Friction Bearings. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 32p NERACIAANT0299
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles contain a discussion of the design and application of magnetic antifriction, or magnetic noncontact bearings as used in high speed electric motors and parallel coaxial rotating disks. (Contains 047 citations.)

PB80-850654 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gear Manufacturing Technology. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 37p NERACEI NT0364
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the method, technology, and the processes involved in the production or manufacturing of mechanical gears. Among the methods mentioned are rolling, hot forging, and the use of solid carbide milling cutters. (Contains 034 citations.)

PB80-851132 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Industrial Robots and Teleoperators . June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 162p NERACEI NT0477
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design, construction, performance, and the economic effectiveness of industrial robots. The uses and application of robots for welding, painting, and other assembly oriented applications are also included. (Contains 200 citations.)

PB80-851553 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Factory Layout. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 83p NERACUSGNT0765
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss industrial technology pertaining to factory layout. Among the topics covered are the design of efficient air circu-

lation systems, pollution control, fire systems, and waste-control. A description of the design of some demonstration plants is also included. (Contains 065 citations.)

PB80-851561 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Factory Layout. April, 1975-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Apr 75-Jun 80,
William V. Sassi. Jun 80, 117p NERACEI NT0765
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss industrial technology pertaining to factory layout. Among the topics covered are the design of efficient air circulation systems, pollution control, fire systems, and waste-control. A description of the design of some demonstration plants is also included. (Contains 127 citations.)

PB80-852973 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gas Bearings. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 155p
NERACIAANT0300
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the design, and application of various types of gas bearings to such devices as aircraft engines, and automotive gas turbines. An analysis of different types of gas bearing devices is also included. (Contains 157 citations.)

PB80-852981 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gas Bearings. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 42p
NERACEDBNT0300
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the design, and application of various types of gas bearings to such devices as aircraft engines, and automotive gas turbines. An analysis of different types of gas bearing devices is also included. (Contains 032 citations.)

PB80-853237 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ceramic Bearings. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jun 80, 32p
NERACIAANT0317
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the design, application, and testing of ceramic bearings. An analysis of various ceramic materials used for these bearings is also included. (Contains 041 citations.)

PB80-853245 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ceramic Bearings. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 36p
NERACUSGNT0317
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the design, application, and testing of ceramic bearings. An analysis of various ceramic materials used for these bearings is also included. (Contains 028 citations.)

PB80-853518 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Abrasive Grinding Wheels. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 79p NERACEI NT0823
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design, production and application of various types of abrasive grinding wheels. Also included are discussions on the development of abrasive methods using diamonds and borazon. (Contains 095 citations.)

PB80-854813 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electric Discharge Machining. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 35p NERACEI NT0853
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the methods and equipment involved in electric discharge machining, and its applications to electronics, tool making, and machining of dyes. (Contains 034 citations.)

PB80-854979 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Atomizers for Liquids. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 59p NERACIAANT0423
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on atomizers with applications such as: fuels, crude oils, coatings, humidifiers, dust control systems, blending, spray drying and defrosters. Theoretical studies, using disk, pneumatic and ultrasonic atomizers are also included. (Contains 050 citations.)

PB80-854987 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Atomizers for Liquids. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 31p NERACUSGNT0423
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on atomizers with applications such as: fuels, crude oils, coatings, humidifiers, dust control systems, blending, spray drying and defrosters. Theoretical studies, using disk, pneumatic and ultrasonic atomizers are also included. (Contains 032 citations.)

PB80-854995 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Atomizers for Liquids. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 128p NERACEI NT0423
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on atomizers with applications such as: fuels, crude oils, coatings, humidifiers, dust control systems, blending, spray drying and defrosters. Theoretical studies, using disk, pneumatic and ultrasonic atomizers are also included. (Contains 146 citations.)

PB80-855000 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Atomizers for Liquids. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 24p NERACEDBNT0423
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on atomizers with applications such as: fuels, crude oils, coatings, humidifiers, dust control systems, blending, spray drying and defrosters. Theoretical studies, using disk, pneumatic and ultrasonic atomizers are also included. (Contains 031 citations.)

PB80-855778 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Knitting Machines. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 115p NERACEI NT0713
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information covering knitting and weaving machinery used in the textile industry are cited. Natural as well as synthetic fibers and materials are discussed. (Contains 152 citations.)

PB80-855786 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Knitting Machines. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 76p NERACUSGNT0713
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information covering knitting and weaving machinery used in the textile industry are cited. Natural as well as synthetic fibers and materials are discussed. (Contains 064 citations.)

PB80-857238 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Hydrostatic Bearings. June, 1970-June, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 54p NERACIAANT0646
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the design, applications and research of hydrostatic bearings. Lubricants, performance and static properties of hydrostatic bearings are also discussed. (Contains 145 citations.)

PB80-858251 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Mechanical Impedance. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 78p
NERACUSGNT0432
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the measurement, theory and reduction methods of mechanical impedance. Among the mechanical systems analyzed are assembled aerospace equipment, rotors, multiresonance systems and machine tools. (Contains 067 citations.)

PB80-858269 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Mechanical Impedance. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 32p NERACEI NT0432
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the measurement, theory and reduction methods of mechanical impedance. Among the mechanical systems analyzed are assembled aerospace equipment, rotors, multiresonance systems and machine tools. (Contains 035 citations.)

PB80-858277 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Mechanical Impedance. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
William V. Sassi. Aug 80, 158p
NERACIAANT0432
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the measurement, theory and reduction methods of mechanical impedance. Among the mechanical systems analyzed are assembled aerospace equipment, rotors, multiresonance systems and machine tools. (Contains 150 citations.)

PB80-859515 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Hydrostatic Bearings. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 46p NERACUSGNT0646
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the design, production, and applications of hydrostatic bearings. Lubricants, performance, and static properties of hydrostatic bearings are also discussed. (Contains 042 citations.)

PB80-859523 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Hydrostatic Bearings. June, 1974-May, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 74-May 80,
Walter Van Put. Jun 80, 162p NERACEI NT0646
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the design, production, and applications of hydrostatic bearings. Lubricants, performance, and static properties of hydrostatic bearings are also discussed. (Contains 053 citations.)

PB80-859838 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Separators. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jun 80, 118p NERACIAANT0656
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the theory, equipment, and application of magnetic separation. Citations include descriptions of processing methods, labor requirements, operational reliability, and safety of magnetic separation techniques which can be applied to the majority of substances, even liquids and gases. (Contains 081 citations.)

PB80-859960 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Diamond Tools. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 63p NERACEI NT0852
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe various types of diamond tools, and their applications to such areas as machining, cutting, drilling, and grinding of various substances. (Contains 064 citations.)

SAND-80-1433C PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Acceleration/Vibration Combined Environment Activities. Interim Report.
R. L. Shuman. 1980, 26p CONF-800574-3
Contract AC04-76DP00789
IMOG meeting held on subgroup environmental testing, Albuquerque, NM, USA, 20 May 1980.

The combining of two environments, i.e., linear acceleration and vibration, for use in laboratory testing to determine the damage to some mechanical devices when simultaneously subjected to these two environments, is discussed. The use of a Genisco centrifuge with an Unholtz-Dickie vibration machine mounted on it is described. Initial efforts at operating a shaker on the centrifuge have not been completely successful, so modifications to the system are being made. (ERA citation 05:029435)

13J. Marine Engineering

AD-A087 983/3 Not available NTIS
British Ship Research Association Wallsend (England) Wallsend Research Station
Journal of Abstracts of the British Ship Research Association. Volume 35. Number 2. Abstracts 52, 223-52, 402.
R. C. Kahler. Feb 80, 57p
See also Volume 35, Number 4, AD-A087 984.
Availability: B.S.R.A., Wallsend (England), Wallsend Research Station (No copies furnished by DTIC).

No abstract available.

AD-A087 984/1 Not available NTIS
British Ship Research Association Wallsend (England) Wallsend Research Station
Journal of Abstracts of the British Ship Research Association. Volume 35. Number 4. Abstracts, 52, 583-52, 762.
R. C. Kahler. Apr 80, 57p
See also Volume 35, Number 1, AD-A085 275.
Availability: B.S.R.A., Wallsend (England), Wallsend Research Station (No Copies furnished by DTIC.

No abstract available.

AD-A088 091/4 PC **A04**/MF **A01**
Georgia Inst of Tech Atlanta School of Aerospace Engineering
The Smoke Hazards Resulting from the Burning of Shipboard Materials Used by the U.S. Navy.
Rept. for 1 Sep 78-31 Aug 79,
Ben T. Zinn, R. F. Browner, E. A. Powell, M. Pasternak, and R. O. Gardner. 22 Jul 80, 64p
NRL-8414
Contract N00014-78-C-0771

A study was conducted to evaluate the hazards due to smoke formation in shipboard fires. The physical and chemical properties of the smoke particulates generated during combustion were determined for representatives of the following three classes of materials abundantly present on shipboard: a wall insulation material, cable jacket materials, and a hydraulic fluid. Physical properties measured were particle size distribution and mean particle diameter, mass fraction of fuel converted to particulates, optical density, particle refractive index, and particulate volume fraction. The dependence of these properties on the temperature of the test-chamber atmosphere and the mode of combustion (flaming or smoldering) was determined. Chemical analysis of the smoke particulates determined the major toxic species generated during the combustion of these materials. Study results indicate that these materials produce smoke particles with log-normal size distributions and mean diameters ranging from 0.4 to 1.5 microns (smoldering) and 1.0 to 1.3 microns (flaming). For these materials total particulate mass is greatest under smoldering combustion, and optical density is greatest under flaming combustion. For smoldering combustion, increasing ambient temperature reduces the mean diameter, peak optical density, volume fraction, and total particulate volume; ambient temperature has little effect upon these properties for flaming combustion. Toxic species identified during smoldering combustion include carbon monoxide, benzene, carbonyl sulfide, hydrogen chloride, acrolein and methacrolein.

AD-A088 172/2 PC **A06**/MF **A01**
Wyle Labs Huntsville AL Eastern Operations
U.S. Coast Guard Safe Loading Standard Test Procedure.
Final rept.
Jun 80, 106p USCG-B-002-80
Contract DOT-CG-12377-A
Supersedes report dated Oct 72, AD-758 302.

This report describes in detail a Safe Loading Standard Test Procedure for outboard boats, inboard boats, inboard/outdrive boats and boats without mechanical propulsion. The Safe Loading Standard Test Procedure is designed to determine whether or not a given boat meets the safe loading requirements outlined in the Federal Boat Safety Act of 1971 (P. L. 92-75) and the rules and regulations in the Federal Register: 37 FR 15782, Aug. 4, 1972, as amended at 39 FR 10899, Mar. 22, 1974; 40 FR 33973, Aug. 13, 1975; 40 FR 43657, Sept. 23, 1975; 40 FR 51440, Nov. 5, 1975; 42 FR 2681, Jan. 13, 1977. Basically, the Safe Loading Standard Test Procedure establishes, by testing in a water tank, the Maximum Weight Capacity and the Maximum Persons Capacity for outboard boats, inboard boats, inboard/outdrive boats and boats without mechanical propulsion. This test procedure was developed after evaluating various test methods for determining the Maximum Weight Capacity and Maximum Persons Capacity. (Author)

AD-A088 173/0 PC **A02**/MF **A01**
Wyle Labs Huntsville AL Eastern Operations
U.S. Coast Guard Safe Powering Standard Test Procedure.
Final rept.,
Jun 80, 22p USCG-B-001-80
Contract DOT-CG-12377-A
Supersedes report dated Sep 72, AD-758 428.

This report describes in detail a Safe Powering Standard Test procedure for outboard powered boats. The Safe Powering Standard Test Procedure is designed to determine whether or not a given boat meets the safe powering requirements outlined in the Federal Boat Safety Act of 1971 (P. L. 92-75) and the rules and regulations in the Federal Register: 37 FR 15782, Aug. 4, 1972. (Author)

AD-A088 174/8 PC **A04**/MF **A01**
Wyle Labs Huntsville AL Eastern Operations
U.S. Coast Guard Flotation Standard Test Procedure.
Final rept.
Jul 80, 75p USCG-B-003-80
Contract DOT-CG-12377-A
Supersedes report dated Jan 73, AD-758 427.

This report describes in detail a Flotation Standard Test Procedure for boats rated for outboard engines larger than two horsepower, boats rated for outboard engines two horsepower or less, for inboard boats, inboard-outdrive boats and airboats and a flotation materials test. The Flotation Standard Test Procedure is designed to determine whether or not a given boat meets the flotation requirements outlined in the Federal Boat Safety Act of 1971 (P. L. 92-75) and the rules and regulations in the Federal Register: 37 FR 15792, Aug. 4, 1972 as amended at 37 FR 17388, Aug. 26, 1972; 39 FR 10899, Mar. 22, 1974; 41 FR 11290, Mar. 18, 1976; 43 FR 56858, Dec 4, 1978. (Author)

AD-A088 185/4 PC **A09**/MF **A01**
Woodward-Clyde Consultants Houston TX
Assessment of the Morison Equation.
Final rept.
Jul 80, 179p CEL-CR-80.022
Contract N68305-80-C-0007

A critical assessment of the Morison equation is provided. The Morison equation is used to calculate the loading on offshore structures due to ocean waves. The assessment covers both the original equation and the modifications currently in use by industrial designers. A review of the literature is provided. It is concluded that the Morison equation provides an adequate design tool provided careful consideration is given to the selection of the fluid kinematic representation and the empirical coefficients. Improvements in the accuracy of the operation can be achieved through research leading to (1) improved descriptions of the sea state, (2) better representations of the water particle velocities and accelerations in combined

wave-current flows, (3) improved quantification of the drag and inertia coefficients, and (4) inclusion of the fluid-structural interaction. (Author)

AD-A088 280/3 PC **A02**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Sea Trials of the Damped Vibration Absorber Fitted to H.M.A.S. Tarakan.
Technical memo.,
A. Goldman. May 80, 25p Rept no. ARL/STRUC-TM-315

A damped vibration absorber, similar to those previously installed on H.M.A.S Balikpapan and H.M.A.S. Brunei, has been fitted to H.M.A.S. Tarakan. Some changes to the installation have been made, and tests carried out to prove the effectiveness of these changes. The reasons for the changes, and details of the tests, are described. (Author)

AD-A088 284/5 PC **A07**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
Challenge to Better Agreement between Theoretical Computations and Measurements in Ship Hydrodynamics. The David W. Taylor Lecture (6th).
Final rept.,
Hajime Maruo. Aug 80, 135p Rept no. DTNSRDC-80/046

Contents: Wave Resistance of Ships in Uniform Forward Motion; Hydrodynamic Forces on Oscillating Slender Ships; Wave Pressure on Slender Ships; Added Resistance in Waves; Concluding Remakrs; Appendix A - Oscillation of a Ship with Six Degrees of Freedom. Appendix B - Theorem of Tuck and Relations Derived Therefrom.

AD-A088 303/3 PC **A04**/MF **A01**
Navy Experimental Diving Unit Panama City FL
Unmanned Evaluation of U.S. Navy UBA EX-16 Prototype Closed Circuit Rebreather.
Test rept.,
James R. Middleton. Dec 79, 54p Rept no. NEDU-11-79

The Navy Experimental Diving Unit (NEDU) evaluated the prototype U.S. Navy Underwater Breathing Apparatus EX-16 in the following configurations: (1) standard hoses with MK-6 mouthpiece; (2) enlarged breathing hoses with MK-6 mouthpiece; and (3) enlarged breathing hoses and the AGA full face mask. A series of unmanned tests was conducted to determine performance characteristics of the various EX-16 configurations. Data derived from these tests will be used in follow-on development and testing of the EX-16 UBA. Results indicate the AGA full face mask with its larger breathing hoses to be the optimum combination for low diver respiratory work. The scrubber canister design is deemed adequate and further modifications are unnecessary. (Author)

AD-A088 304/1 PC **A03**/MF **A01**
Navy Experimental Diving Unit Panama City FL
Unmanned Evaluation of U.S. Navy MK 11 Semi-Closed Circuit Mixed Gas UBA.
Test rept. Jun-Sep 79,
James R. Middleton. Jun 80, 34p Rept no. NEDU-3-80

NEDU performed unmanned tests on the MK 11 UBA incorporating Field Change Number 979A (modified canister configuration containing a heated central core and Koegel check valves in the M-11 mask). Breathing resistance and canister duration were evaluated at depths ranging from 250 to 750 fsw. Results showed breathing resistance to be significantly improved over previous designs and capable of supporting heavy work at depths to 650 fsw. Canister durations were improved to 450 fsw; however, most of this improvement was lost at 650 fsw in water below 40 deg F. (Author)

AD-A088 443/7 PC **A06**/MF **A01**
ARINC Research Corp Annapolis MD
Trends and Associated Causal Factors For Costs of Work Performed During Naval Ship Overhauls For Selected Equipments.
Final rept.,
J. Caso. Jun 80, 105p Rept no. 1669-01-TR-2186 Contract N00014-79-C-0018

This report presents the results of a study conducted to review cost trends during ship overhauls for selected equipments on the DDG-2 ship class from 1970 to 1979. The objective of the study was to analyze observed cost growth (or lack of growth) for like systems or components having representative and simple bounded work efforts. Contributory factors such as direct labor productivity, changes in production support activities, and the effects of program and policy changes were analyzed and, when possible, quantified. (Author)

PB80-226574 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
The Effects of Manual Transmission Shift Points on Emissions and Fuel Economy of a 1977 Chevrolet Chevette When Tested by the Hot LA-4 Procedure.
Technical rept.,
F. Peter Hutchins. Dec 77, 13p EPA-AA-TAEB-77-15

The EPA is presently conducting studies which are directed to identifying differences in fuel economy as measured on the FTP test and reported in the Mileage Guide compared to in-use vehicle measurement. One of these studies is directed to the identification of differences in the fuel economy performance of production vehicles relative to the counterpart certification vehicle. A brief study of the effects on emissions and fuel economy of variations in manual transmission shift points was conducted on one of these production vehicles. The results of this transmission shift point study are contained in this report. The conclusions from these tests can be considered to be quantitatively valid only for the specific type of vehicle used in the study, although it is reasonable to extrapolate the results to other types of vehicles in a directional or qualitative manner.

PB80-852288 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Disaster Prevention for Offshore Structures. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 93p NERACEI NT0821
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the dynamic behavior and fatigue and failure analysis of offshore structures for safety considerations and for disaster prevention are contained in this retrospective bibliography. (Contains 085 citations.)

PB80-853120 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Submersible and Semisubmersible Vessels. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 48p NERACUSGNT0241
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the design, development, classification, and construction of various type of submersible and semisubmersible vessels. (Contains 033 citations.)

PB80-858582 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Offshore Operations. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 110p NERACUSGNT0774
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on a variety of activities and equipment related to offshore oil and gas, ocean thermal, and nuclear power plant operations are included. Topics include communications, instrumentation, support operations, energy storage systems, pollution, environmental impacts, exploration, drilling, and pipelines in this retrospective bibliography. (Contains 077 citations.)

PB80-858590 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Offshore Operations. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 191p NERACEDBNT0774
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on a variety of activities and equipment related to offshore oil and gas, ocean thermal, and nuclear power plant operations are included. Topics include communications, instrumentation, support operations, energy storage systems, pollution, environmental impacts, exploration, drilling, and pipelines in this retrospective bibliography. (Contains 192 citations.)

PB80-858616 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Offshore Safety. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 59p NERACEI NT0775
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on accident prevention, fire prevention, and the safety of structures in offshore operations are contained in this retrospective bibliography. Traffic management and safety engineering are the chief disciplines included. (Contains 057 citations.)

PB80-858632 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Offshore Safety. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 91p NERACEDBNT0775
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on accident prevention, fire prevention, and the safety of structures in offshore operations are contained in this retrospective bibliography. Traffic management and safety engineering are the chief disciplines included. (Contains 083 citations.)

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

AD-A088 010/4 PC **A05**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
Performance of Multiple-Disk-Rotor Pumps with Varied Interdisk Spacings.
Final rept.,
Joseph H. Morris. Aug 80, 94p Rept no. DTNSRDC-80/008

Disk-rotor pumps having various configurations with interdisk spacings ranging from 0.006 to 0.26 inch (0.15 to 6.6 millimeters) were investigated at operating speeds from 3550 to 7000 revolutions per minute. Operation data for the pumps with the various rotors is included. Good performance at wide interdisk spacings was obtained. (Author)

ALO-73 PC **A16**/MF **A01**
Burns and Roe, Inc., Oradell, NJ.
Investigation of Valve Failure Problems in LWR Power Plants.
Apr 80, 351p
Contract AC04-76DP00789

An analysis of component failures from information in the computerized Nuclear Safety Information Center (NSIC) data bank shows that for both PWR and BWR plants the component category most responsible for approximately 19.3% of light water reactor (LWR) power plant shutdowns. This investigation by Burns and Roe, Inc. shows that the greatest cause of shutdowns in LWRs due to valve failures is leakage from valve stem packing. Both BWR plants and PWR plants have stem leakage

problems (BWRs, 21% and PWRs, 34%). (ERA citation 05:028939)

FE-2355-36(Rev.N/C) PC **A07**/MF **A01**
Consolidated Controls Corp., El Segundo, CA.
Failure Analysis Report: Lockhopper Valve Type I, II and IV P/N 75895, S/N 3.
Jul 79, 128p
Contract EX-76-C-01-2355

A Lockhopper Valve Type I, II, and IV (CCC P/N 75895) (S/N 3) was assembled in accordance with CCC Assembly Procedure FE-2355-28. This was the first unit assembled with a Ceramic/Refractory Composite Gate (CCC P/N 76273). The final steps in the assembly procedure involve adjusting the actuator to control the proper positioning of the gate to the open and closed positions. These adjustments require that the actuator be operated a number of times (three or four) to obtain proper positioning. The actuator was also operated a number of times in order to inspect the gate location. After these few operations, obvious grinding, gritty noises were heard emanating from the gate area during cycling. Operations were immediately stopped. Subsequent operation and inspection showed scratches on the inlet and outlet seats and chipping on the gate seal disc. Operation was halted and the valve was disassembled. On disassembly, the gate refractory was found to be broken at the narrow section around the seal disc, the seal disc was scored and chipped, the wear inserts were heavily scored, and the inlet and outlet seats were scored and chipped. The failures were inside the valve at the time of failure and out of sight, so any analysis must be somewhat speculative. Nevertheless, the failures can be directly attributed to the wear inserts, high spring loading, and/or sharp edges on the inlet seat. It is unlikely that the gate broke before the other damage, for instance, in view of the large excess strength and in view of another similar design which did not have any problems. Various other scenarios have been considered, but none adequately explain the damage encountered. (ERA citation 04:055939)

PB80-851546 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Solenoid Valves. June, 1970-June, 1980 (Citations from the Energy Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 102p
NERACEDBNT0680
Sponsored in part by National Technical Information Service, Springfield, VA.

The reports cover the applications of solenoid valves in the nuclear industry, solar heating, fuel control, carburetors, intake air of combustion engines and pressure systems. Articles on failures of the solenoid valves are also included. (Contains 078 citations.)

PB80-852650 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Air Filter Design and Applications. July, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jul 76-May 80,
T. David Kennedy. Jun 80, 185p
NERACEDBNT0883
Sponsored in part by National Technical Information Service, Springfield, VA.

Technical reports on the subject of air filters are collected in this bibliography. Articles cover design, materials, test results, and systems. Extensive coverage is given to filtering radioactive materials as well as ash from hydrocarbon fuels and baghouses. Methods of testing and analysis, fabric and fiber materials, down to complex and simple filter designs are included. (Contains 189 citations.)

PB80-853948 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Solenoid Valves. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 50p NERACUSGNT0680
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited covering the applications of solenoid valves in the nuclear industry, solar hearing, fuel control, carburetors, air intake of combustion engines, and pressure systems. Articles on failures of the solenoid valves are also included. (Contains 044 citations.)

13L. Safety Engineering

AD-A088 191/2 PC **A05**/MF **A01**
Scientific Service Inc Redwood City CA
Proceedings of the Hazardous Materials Conference (1979) at Emmitsburg, Maryland, 25-26 June 1979.
Final rept.,
J. V. Zaccor, H. L. Hsu, and C. Wilton. Jul 80,
76p Rept no. SSI-7911-5
Contract DCPA01-79-C-0239

The objective of this hazardous materials conference was to obtain input from government agencies to help establish priorities for the Federal Emergency Management Agency-sponsored research in the hazardous materials area. Participants in the two-day conference divided into four workshops to discuss instrumentation, short-term needs, long-term needs, devices, technology, hardware, and prevention and cleanup. Problems and research needs were identified and discussed. (Author)

AD-A088 356/1 PC **A05**/MF **A01**
Scientific Service Inc Redwood City CA
Planning Document for Hazardous Materials Research.
Final rept.,
J. V. Zaccor, and C. Wilton. Jul 80, 83p Rept no. SSI-7911-6
Contract DCPA01-79-C-0239

The report discusses research needed to improve the management and control of hazardous materials. Input was derived largely from material discussed at a conference comprising representatives of government agencies involved in hazardous materials control and management. Conference topics encompassed: instrumentation for material and for hazard identification; equipment for operations, communication, and safety; training and education; and regulatory and environmental aspects and issues. The objective was to develop a research program plan, based on practical needs, that could serve as the nucleus to foster evolution of an integrated effort among the agencies involved in the complex problem of managing and controlling hazardous materials. To provide a focal point for further action, areas of concern brought up at the conference are discussed and some specific programs and funding levels suggested. The latter are summarized briefly in tables included at the end of the main text. (Author)

NUREG/CR-1166 PC **E02**/MF **A01**
Sandia Labs., Livermore, CA.
COPS Model Estimates of LLEA Availability Near Selected Reactor Sites,
K. P. Berkbigler. Jul 80, 30p SAND79-8261
Document includes 1 sheet of 24X reduction microfiche.

The COPS computer model has been used to estimate local law enforcement agency (LLEA) officer availability in the neighborhood of selected nuclear reactor sites. The results of these analyses are presented both in graphic and tabular form in this report.

NUREG-0090-V-3-1 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Management and Program Analysis.
Report to Congress on Abnormal Occurrences. Volume 3, Number 1.
Quarterly rept. Jan-Mar 80.
Sep 80, 39p
See also Volume 2, Number 4, NUREG-0090-V-2-4.

Section 208 of the Energy Reorganization Act of 1974 identifies an abnormal occurrence as an unscheduled incident or event which the Nuclear Regulatory Commission determines to be significant from the standpoint of public health or safety and requires a quarterly report of such events to be made to Congress. This report, the twentieth in the series, covers the period January 1 to March 31, 1980. During the period, there were two abnormal occurrences at the nuclear power plants licensed to operate: one involved exposures to beta radiation in excess of regulatory limits and the second (a generic concern) involved a transient initiated by partial loss of power. There was one abnormal occurrence at the fuel cycle facilities (other than nuclear power plants); the incident involved a loss of confinement system which resulted in inhalation of plutonium by an employee.

PB80-216542 PC **A04**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
An Analysis of the Potential Legal Constraints on the Use of Mechanical Devices to Monitor Driving Restrictions.
Final rept. Nov 76-Sep 79,
Paul A. Ruschmann, Hal O. Carroll, Murray Greyson, and Kent B. Joscelyn. Sep 79, 62p UM-HSRI-79-65, DOT-HS-805 523
Contract DOT-HS-7-01536

An analysis was made of the potential legal constraints on the use of mechanical devices to supervise drinking and driving restrictions. These conceptual devices would be installed on vehicles operated by restricted drivers. Two devices contain psychomotor tests and are designed to prevent driving during prohibited times of the day. Analysis of current law revealed that the proposed devices would be a constitutional means of enforcing drinking and driving restrictions. Methods for use of the devices that will resolve other possible legal constraints are presented.

PB80-216559 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
An Analysis of the Legal Feasibility of Imposing Owner Liability for Moving Traffic Violations.
Final rept. Nov 76-Sep 79,
Paul A. Ruschmann, Murray Greyson, Hal O. Carroll, and Kent B. Joscelyn. Sep 79, 25p UM-HSRI-79-63, DOT-HS-805 526
Contract DOT-HS-7-01536

An analysis was made of the legal feasibility of a proposed owner-liability countermeasure. Under this countermeasure, a vehicle owner could be held civilly liable for speeding and other minor moving traffic violations committed by a driver using the vehicle with permission. The approach underlying the owner-liability countermeasure is similar to that used to enforce parking regulations. Relevant constitutional provisions, legislation, and court decisions dealing with holding individuals responsible for the actions of others, were analyzed. Analysis of current law revealed that some forms of legislation imposing liability on owners of vehicles driven in violation of traffic laws likely would be upheld by courts as constitutional. To be upheld, however, owner-liability legislation could impose only small, civil penalties (similar to parking fines), but could not impose jail sentences, license suspensions, or violation points on owners. In addition, analysis of legislation in other areas of traffic law revealed that the proposed owner-liability countermeasure might encounter public opposition; if such opposition were to develop, it could influence legislative willingness to enact owner-liability legislature.

PB80-222060 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
An Analysis of the Potential Legal Constraints on Proposed Model Legislation Creating a Class of Traffic Offenses Aggravated by Alcohol.
Final rept. Nov 76-Sep 79,
Paul A. Ruschmann, and Kent B. Joscelyn. Sep 79, 37p UM-HSRI-79-61, DOT-HS-805 522
Contract DOT-HS-7-01536

An analysis was made of the legal feasibility of proposed legislation intended to deal with drinking drivers who do not meet the legal standard for alcohol intoxication, but who commit hazardous traf-

fic violations while their blood alcohol concentration (BAC) is high enough to increase the risk of traffic crash involvement. The combination of alcohol involvement and a hazardous violation would be classified as a traffic offense aggravated by alcohol. Convicted offenders would receive increased sanctions, alternative sanctions (such as mandatory attendance at an alcohol-education program), or both. Examination of current law revealed that the proposed legislation would be constitutional in principle. However, chemical testing of drivers could be compelled only if there existed probable cause to arrest for a drinking-driving offense. In addition, enacting the proposed legislation would require substantial changes in existing state implied-consent and drinking-driving laws; for that reason, practical and potential constraints might be encountered.

PB80-222078 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
An Analysis of the Potential Legal Constraints on the Use of Speed Measuring Devices.
Final rept. Nov 76-Sep 79,
Paul A. Ruschmann, Murray Greyson, and Kent B. Joscelyn. Sep 79, 40p UM-HSRI-79-62, DOT-HS-805 524
Contract DOT-HS-7-01536

An analysis was made of the potential legal constraints on the use of existing and proposed devices for measuring vehicle speeds. Some of the proposed devices are remote in nature and would operate without a police officer being present. Examination of current law reveals that existing devices, especially radar devices, for the most part face no substantial constraints. However, the use of such devices as VASCAR and stop watches, which are based on time-distance measurements, are prohibited by law in a few states. The use of proposed remote-observation devices is constrained by laws governing speed prosecutions; the chief constraint is that to obtain a conviction, driver must be personally identified and proved responsible.

PB80-226632 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Flammability Testing of Solids Under the Federal Hazardous Substances Act.
Final rept. 1974-75,
Richard D. Peacock, and Marianne P. Vaishnav. Apr 80, 93p NBSIR-78-1580
Supersedes PB80-179047. Sponsored in part by Consumer Product Safety Commission, Washington, DC.

The objective of the Federal Hazardous Substances Act is to protect the consumer from hazards that arise from a large variety of products. The Act and its regulations have several provisions pertaining to the measurement of the flammability of substances. Some are detailed and explicity; others provide only general guidelines. This report presents the results of a program to provide improvements to particular provisions of the Act and includes test methods that may be used for the testing of various solid materials. An extensive review of the Federal Hazardous Substances Act, its predecessor, and the legislative history provides the basis for some specific recommendations for improvement or clarification. Experimental work performed for the improvement of test methods for shredded or slit films, powders, pastes, and granular substances, and for extremely flammable solids is discussed. This report is based on work sponsored by the Consumer Product Safety Commission and performed from 1974 through 1976.

PB80-227275 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
Thermal Theory of Ignition, Burning and Extinction of Materials in a 'Stagnant' Gaseous Boundary Layer.
Current papers,
P. H. Thomas, and M. L. Bullen. c1978, 36p CP-12/78

The ignition of solid materials in fires by radiation and nonvection is largely dominated by the thermal inertia of the solid which controls its rise in temperature to that at which sufficient hot flammable gases are emitted, but the limiting conditions within which ignition is possible are influenced strongly by gas phase considerations. Here a simplified one-dimensional quasi-steady model of the gaseous boundary layer as a 'stagnant film' is constructed in conjunction with a pyrolysis or vaporization relation for the fuel and various features of the theory are discussed and related to ignition, steady burning and extinction. In particular, the relation between the constant surface temperature criterion for ignition by radiation and the Zeldovitch treatment of ignition of an exothermic reacting gas layer is explored. (Copyright (c) British Crown Copyright.)

PB80-227309 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Effects of Installing an Audible Signal for Pedestrians at a Light Controlled Junction,
D. G. Wilson. c1980, 15p TRRL-LR-917
Also pub. as ISSN-0305-1293.

The report describes a study on behavior of pedestrians before and after installing an audible signal at a crossing.

PB80-227820 PC **A03**/MF **A01**
Bureau of Radiological Health, Rockville, MD.
Microwave Hazard Instruments: An Evaluation of the Narda 8100, Holaday HI-1500, and Simpson 380M.
Final rept.,
W. A. Herman, and D. M. Witters, Jr. Jun 80, 49p DHHS/PUB/FDA-80-8122, FDA/BRH-80/102

A set of 13 parameters most likely to have significant impact on the accuracy of microwave oven survey meters was devised. Measurement systems and protocols were developed and evaluated. The resulting techniques were used to evaluate widely used survey meters produced by three manufacturers. The results of these evaluations are presented, along with additional analyses of problems generic to such survey instruments.

PB80-851181 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Shipboard Fires. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 95p
NERACUSGNT0488
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the prevention, detection, and extinguishing of fires aboard ships, including a description of sprinkler systems, fire resistant materials, and detection devices. Also included are reports of marine accidents and rescue techniques. (Contains 071 citations.)

PB80-852098 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fire Detection and Extinguishment. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 127p NERACEI NT0357
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the methods and equipment used in the detection and extinguishment of fires in underground mines, homes and buildings. The application of computer technology to this field is also included in some of the discussions. (Contains 143 citations.)

PB80-852221 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fire Detection and Extinguishment. February, 1971-May, 1980 (Citations from the NTIS Data Base).
Rept. for Feb 71-May 80,
William V. Sassi. Jun 80, 201p
NERACUSGNT0357
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the methods and equipment used in the detection and extinguishment of fires in underground mines, homes, buildings, aircraft and other structures. Methods and devices which are used to check and verify the reliability of fire detectors are also included. (Contains 200 citations.)

PB80-852957 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fire Detection and Extinguishment. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 42p
NERACEDBNT0357
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the methods and equipment used in the detection and extinguishing of fire in underground mines, homes, and buildings. The application of computer technology to this field is also included in some of the discussions. (Contains 036 citations.)

PB80-853385 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Shipboard Fires. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 29p NERACEI NT0488
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the prevention, detection, and extinguishing of fires aboard ships and tankers. Also included is a description of sprinkler systems, fire resistant materials, and detection devices. (Contains 024 citations.)

PB80-855380 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Security Devices. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 196p NERACEI NT0384
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information on security devices is cited. Topics on high security locks, alarm systems and personnel detectors are also included. (Contains 102 citations.)

PB80-855398 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Security Devices. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jul 80, 197p
NERACEDBNT0384
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information on security devices is cited. Topics on high security locks, alarm systems and personnel detectors are also included. (Contains 139 citations.)

13M. Structural Engineering

LBL-9900 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Fire Growth Experiments: Toward a Standard Room Fire Test.
R. B. Williamson, and F. L. Fisher. May 80, 43p
CONF-791048-7
Contract W-7405-ENG-48
The Combustion Institute Western States Section meeting, Berkeley, CA, USA, 15 Oct 1979.

The use of full-scale room fire experiments and the development of a standard room fire test are discussed. A series of room fire experiments with a

gas burner ignition source, and gypsum wallboard, glass fiber insulation and plywood linings are described in detail. The results of the experiments are discussed in the context of a standard room fire test. (ERA citation 05:031073)

ORNL/Sub-7686/1 PC **A07**/MF **A01**
Princeton Univ., NJ. Guggenheim Labs.
Smoldering Combustion Hazards of Thermal Insulation Materials.
T. J. Ohlemiller, and F. E. Rogers. Jul 80, 140p
Contract W-7405-ENG-26

Work on the smolder ignitability in cellulosic insulation and on thermal analytical characterization of the oxidation of this material is presented. Thermal analysis (TGA and DSC) shows that both retarded and unretarded cellulosic insulation oxidizes in two overall stages, both of which are exothermic. The second stage (oxidation of the char left as a residue of the first stage) is much more energetic on a unit mass basis than the first. However, kinetics and a sufficient exothermicity make the first stage responsible for ignition in most realistic circumstances. Existing smolder retardants such as boric acid have their major effect on the kinetics of the second oxidation stage and thus produce only a rather small (20 exp 0 C) increase in smolder ignition temperature. Several simplified analogs of attic insulations have been tested to determine the variability of minimum smolder ignition temperature. These employed planar or tubular constant temperature heat sources in a thermal environment quite similar to a realistic attic application. Go/no-go tests provided the borderline (minimum) ignition temperature for each configuration. The wide range (150 exp 0 C) of minimum ignition temperatures confirmed the predominant dependence of smolder ignition on heat flow geometry. Other factors (bulk density, retardants) produced much less effect on ignitability. (ERA citation 05:030799)

PB80-212632 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
Smoke Release From Wall Linings in Full-Scale Compartment Fires.
Current papers,
W. D. Woolley, Monica M. Raftery, S. A. Ames, and J. V. Murrell. c1978, 18p CP-56/78

Smoke densities and rates of smoke production have been measured when different wall lining materials (chipboard, fiber insulating board, hardboard, polystyrene, plasterboard, and glass reinforced polyester) were exposed to fire in a full-scale compartment. A wooden crib was used as the main fire load, of a size equivalent to burning the contents of a lightly furnished room. Implications of the smoke released by the different linings are discussed, with some reservations because only a single test was carried out with each wall lining, and because in tests of this kind, fire development and smoke production relate to environmental conditions and to the exact nature of the material examined. (Copyright (c) British Crown Copyright.)

PB80-222953 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Microelectronics in Building Services.
Current papers,
D. J. Fisk. c1979, 17p CP-12/79

This paper reviews for discussion the potential impact of microelectronics in building services. It is divided into three parts, a general overview, definition of terms, and detailed applications. It is argued that beyond direct substitution of existing electromagnetic, mechanical and pneumatic logic functions, there are many areas of application which could extend the effectiveness of the provision of building services. These include both extension of the 'control function' and the 'data management' function. However, it appears that in many areas weaknesses in the present understanding of exact user needs and requirements represent the largest single barrier to exploiting the flexibility and power of microelectronic techniques. There may even be a danger that elegant engineering solutions will be produced to solve the wrong problems.

PB80-227101 PC **E02**/MF **E02**
Building Research Station, Watford (England).
The Control of Noise from Fixed Premises-Some Case Histories.
Current papers,
W. A. Utley, and T. W. Heppell. c1978, 40p CP-36/78

This paper describes 23 case histories of noise control. For each case history, details are given of the problem, the remedial action taken and the reduction in noise levels achieved. Methods of controlling noise are described and illustrated by reference to particular case histories. An examination of the case histories described in the paper shows that almost half of the problems arose from noise emitted by machinery or equipment situated outside the main factory building. In about a third of all the cases the noise had significant tonal content. (Copyright (c) British Crown Copyright.)

PB80-227127 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
Fire Risks in High-Rise Buildings.
Current papers,
R. E. H. Read. c1979, 24p CP-1/79

Fire experience and statistical data in the UK indicate that high-rise buildings are not a special fire hazard when correctly designed and incorporating the right standards. A limited investigation, which included a survey of a few high-rise buildngs, has shown that present regulations and codes can be adequate when properly applied. (Copyright (c) British Crown Copyright.)

PB80-227143 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Field Measurements of the Sound Insulation of Floating Party Floors with a Solid Concrete Structural Base.
Current papers,
E. C. Sewell, and R. S. Alphey. c1979, 30p CP-3/79

This paper is concerned with floors with a solid concrete structural base, cast either in situ or in the form of room-sized precast slabs. Such floors differ from those with a hollow beam, or beam and hollow pot, structural base in several respects which might affect performance. Airborne insulation performance was found to be better than impact performance relative to the standard performance curves for all three groups of floors. (Copyright (c) British Crown Copyright.)

PB80-227150 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Resource Inputs to Construction: The Labour Requirements of House Building.
Current papers,
J. Lemessany, and M. A. Clapp. c1978, 31p CP-76/78

This paper describes the site labor used for new local authority and private house construction, and for local authority housing improvement work. Data were obtained from existing records of contracts completed between 1967 and 1975. The effects of different factors on labor input have been investigated. When industrialized or rationalized-traditional methods were used for local housing authority housing, 30 per cent less labor was required than for houses of traditional--all brick and block--construction. Trade breakdowns for each group of contracts are given. They show a marked difference in the skill content between new housing and improvement work. (Copyright (c) British Crown Copyright.)

PB80-227168 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
An Investigation into the Fire Problems Associated with Wood Wool Permanent Shuttering for Concrete Floors.
Current papers,
H. L. Malhotra, and W. A. Morris. c1978, 18p CP-68/78

Some recent incidents have highlighted concern over the likely effects of defective concrete fill in the ribs of floors provided with wood wool permanent shuttering. The investigation examined the problem on simulated constructions in small-scale and verified the findings with a large-scale test. Guidance is provided of the likely fire resistance of floor constructions where the degree of defect can be quantified. (Copyright (c) British Crown Copyright.)

PB80-227184 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Some Preliminary Load Tests on Brick Veneer Attached to Timber-Framed Panels.
Current papers,
J. F. A. Moore. c1978, 13p CP-62/78

The interaction between brickwork and timber-framed panels is strongly influenced by the stiffness of the ties connecting them. Tests on flexible strip ties show that varying the geometry of installation may alter their stiffness as much as fivefold. Using ties in a mode less flexible than usually specified, the stiffness of timber panels under in-plane racking loads and under lateral wind loading was increased to threefold. The integrity of cracked brickwork under wind-suction loading was enhanced by the presence of such ties. Nevertheless, the potential variability of such composite action suggests that it should not be taken into account in the normal design of timber-framed houses. (Copyright (c) British Crown Copyright.)

PB80-227226 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Field Measurements of the Sound Insulation of Plastered Solid Brick Walls.
Current papers,
E. C. Sewell, and R. S. Alphey. c1978, 17p CP-37/78

This report describes results of measurements made as part of a survey of sound insulation between modern dwellings. It is restricted to dwellings in which the leaves of the external walls associated with plastered solid brick party walls were built either of brick or blockwork of mass not less than 120 kg/square meter or of lightweight panelling. Performance was superficially better with flanking walls of lightweight panelling, but the difference was not significant. When results obtained with the two flanking arrangements are combined, it is found that the performance standard incorporated as a deemed-to-satisfy specification in the Building Regulations was attained by about 65 per cent of the combined sample of walls built in the 1970s. Comparison with results from a sample of similar party walls tested in the years 1948-1956 suggests that the general level of performance provided by recently built walls is somewhat lower than that provided by older walls. (Copyright (c) British Crown Copyright.)

PB80-227234 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
Life Safety: What Is It and How Much Is It Worth.
Current papers,
C. H. Green, and R. Brown. c1978, 13p CP-52/78

This paper presents a precedure for estimating the optimal level of risk, including the factors that effect the acceptability of risk in different situations. The relationship between perceived risk and statistical risk is discussed, and some preliminary experimental results presented. (Copyright (c) British Crown Copyright.)

PB80-227242 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Some Observations on the Dynamic Sway Characteristics of Concrete Structures.
Current papers
A. P. Jeary, and P. R. Sparks. c1978, 21p CP-7/78

This paper describes the experimental technique used in the vibrator tests on a number of concrete structures as part of a research program investigating the response of structures to wind excitation. It discusses the results obtained and their implications. (Copyright (c) British Crown Copyright.)

PB80-227267 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
The Repeatability and Reproduceability of Test Results on Windows and Wall Span Elements and the Expected Results.
Current papers,

J. F. S. Carruthers, and C. J. Newman. c1977, 14p CP-49/77
Paper presented at the Paul Rousseau Symposium on the testing of wall elements and windows held at Vilvorde near Brussels, Belgium, 3 October 1977.

The variations in the test results which occur with the laboratory procedures for assessing the air and water penetration attributes of windows are discussed. Data are presented for windows examined under British Standard BS 4315: Part 1 'Methods of test for resistance to air and water penetration - windows and gasket glazing system'. The implications of these tests for the development of performance levels for use in standards and procurement documents are considered and a two-stage statistical procedure is proposed, based in the first instance on tests on five windows. The use of such a procedure will permit the acceptance with confidence of test results as being a correct interpretation of the performance of a window type under the assessment procedure. However, it is emphasized that before meaningful performance levels can be set there is a need to correlate the performance of windows as established under the laboratory assessment procedure with the actual performance of windows installed and in use in buildings. (Copyright (c) British Crown Copyright.)

PB80-227283 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
A Study of the Operation and Effectiveness of Fire Detectors Installed in the Bedrooms and Corridors of Residential Institutions.
Current papers,
R. H. Kennedy, K. W. P. Riley, and S. P. Rogers. c1978, 20p CP-26/78

A series of full-scale fire tests was carried out to study the general operation and effectiveness of fire detectors mounted in a room and corridor test facility, representing part of a residential institution. The tests were performed with various experimental configurations, including the bedroom door and window open and closed, and with smouldering and flaming fires. Instruments were installed to measure smoke concentration (based on both ionization chamber and optical obscuration principles) for the assessment of detector behavior. The work has shown that ionization chamber type detectors in the room of fire origin or in the corridor do not necessarily provide adequate warning that the escape route is impassable, or that the conditions in the room are hazardous to life. This observation stems from the apparent lack of sensitivity of ionization chamber detectors to smoke from smouldering bedding. The general results of the work which demonstrate the ability of smoke detectors to give warning for evacuation are presented together with the main conclusions. (Copyright (c) British Crown Copyright.)

PB80-227291 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Subjective Responses to the Environmental Effects of Traffic in Real Life and Simulated Environments,
P. F. Rosman. c1980, 35p TRRL-LR-911
Also pub. as ISSN-0305-1293.

The TRRL Environmental Simulator is a facility that allows simulations of the effects of traffic conditions on environments to be displayed to members of the public. An investigation was conducted to examine the relationship between assessments made after experiencing the simulations with assessments made by residents based on the experience of living in the environments simulated. One hundred and seventy three subjects from four roads participated in the investigation. They assessed their own home environment and their experience of traffic nuisance on various dimensions, and then answered the same questions about the simulations of the roads of the other participants. By this means, for each of the four roads there were at least 'own home' assessments and at least 123 'simulator' assessments. Comparisons of the assessments indicate that although the assessments of simulations are generally reliable between the subjects from different locations, they are not valid as substitutes for own home assessments. It is suggested that this is due to their interrelated psychological factors of expectation, relationalization and adaptation that influence own home but not simulator assessments. It is concluded that the simulator has utility for obtaining informed dispassionate judgements of environments and traffic conditions. (Copyright (c) Crown Copyright 1980.)

PB80-227382 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Floor Loadings in Domestic Buildings - The Results of a Survey.
Current papers,
G. R. Mitchell, and R. W. Woodgate. c1977, 29p CP-2/77

A description is given of a survey of imposed floor loadings in domestic buildings. Loads due to furniture and those due to persons were both included in the survey. Results are analyzed separately for flats and for the various floor stages present in houses. Loading intensities, equivalent uniformly distributed loads, and load concentration factors are given in statistical terms both for the different categories of room and also for floor zones in eight ranges of area lying between 1 and 70 square meters. The composition of the heavier loadings is indicated. The information given should contribute toward the assessment of design loadings for future buildings of this type. (Copyright (c) British Crown Copyright.)

PB80-227408 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
Guide to Design of Cavity Barriers and Fire Stops.
Current papers,
F. Spiegelhalter. c1977, 31p CP-7/77

This pamphlet presents an investigation of the practical problems involved in choosing appropriate materials and methods of fabricating and erecting cavity barriers in a number of typical building situations to prevent spread of fire. (Copyright (c) British Crown Copyright.)

PB80-227473 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
Fire Spread and Plastics Pipes.
Current papers,
M. Curtis. c1977, 40p CP-38/77

In this report the risk of spread of fire due to the passage of plastics pipes through fire-resisting elements was investigated using a gas-fired furnace similar to that used for fire-resistance tests specified in BS 476: Part8:1972. The results showed that the integrity of the element was usually lost quickly where plastics pipes penetrated simple wall constructions especially when thermoplastic materials of low melting point were used: chlorinated PVC gave the most satisfactory results. The report also ascertained the performance in fire of a domestic installation and accessed the risk of spread from one compartment to another through a system contained either within a protected shaft or enclosure. Floor stops within the protected shaft were shown to be necessary together with some control of protected shaft or enclosure construction. (Copyright (c) British Crown Copyright.)

PB80-227481 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Field Measurements of the Sound Insulation of Party Walls in Timber-Framed Dwellings.
Current papers,
E. C. Sewell, and R. S. Alphey. c1977, 10p CP-39/77

The results are described of measurements made in timber-framed dwellings as part of a survey of sound insulation in moders constructions. The performance standard incorporated as a deemed-to-satisfy specification in the Building Regulations was attained by 92 per cent of the walls tested. All the party walls which did not attain the standard had design features which clearly distinguished them from the majority of walls in the sample. For the usual design, the results suggest that over 99 per cent of walls should achieve the performance standard. (Copyright (c) British Crown Copright.)

PB80-227499 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Field Measurements of the Sound Insulation of Heavy Solid Concrete Party Walls.
Current papers,
E. C. Sewell, and R. S. Alphey. c1977, 12p CP-43/77

The results are described of measurements made as part of a survey of sound insulation between modern dwellings. Data for walls of dense concrete, either cast in-situ or of large precast panels, and for walls of no-fines concrete are analyzed separately. When data from clearly atypical sets are excluded, it is seen that the performance standard incorporated as a deemed-to-satisfy specification in the Building Regulations was attained by nearly all the dense concrete walls and by about 80 percent of the no-fines concrete walls. However, the proportion of the total number of sets which could be regarded as atypical was almost 20 percent, and some of the walls in these sets showed very poor performance. Most of the poor results are attributed to special features of the external flanking walls or of the flanking wall/party wall junction. (Copyright (c) British Crown Copyright.)

PB80-228000 PC **A10**/MF **A01**
Gamze-Korobkin-Caloger, Inc., Washington, DC.
Analysis of Residential Duct Losses.
Final rept. Mar 79-Apr 80,
Joseph A. Orlando, Maurie G. Gamze, N. Malik, R. Crews, and G. Michaels. Aug 80, 219p 9240-2, GRI-79/0037
Contract GRI-5011-341-0156

Little previous data existed on the increase in gas consumption for residential householeating caused by heat losses from duct distribution systems. The loss of heat from such a system does not necessarily result in the loss of energy from the house-heating function as this heat may eventually find its way into living space. To assess the impact of measured duct losses on energy consumption, it is necessary to consider the duct system as but one element in the residential environmental control system, that includes both the building frame and the furnace. Based on data collected in this effort, it was concluded that duct systems should include return registers in each room and balancing dampers in all supply branches. This will increase occupant comfort and decrease heating costs. It may also improve the performance of a central air-conditioning system. It was also found that taping and insulating duct-work can produce meaningful energy savings, while the use of outside air for combustion was of minor consequence. This report describes the various tasks performed by GKC including a review of the literature for information on duct losses and on testing techniques which could be applied to measure duct issues; development of a procedure for measuring residential duct losses; data collection in a number of dwelling units in the Chicago and Washington, D.C. area; and actual duct loss computations. Finally, the various loss mechanisms were identified and examined.

PB80-850472 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Prefabricated Homes. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jul 80, 57p NERACEI NT0310
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design, construction, economic advantages, and social implications of mobile and prefabricated housing. Also mentioned is the possibility of prefabricated homes as a solution to the current housing shortage. (Contains 058 citations.)

PB80-851983 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Roofs for Residential Dwellings. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 81p NERACEDBNT0949
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the analysis, construction, and efficiency of roofs for apartment buildings and single-family houses. Citations include applications for integral solar air and water heaters and coolers, with descriptions of functional models and their thermal efficiencies, and insulation requirements. (Contains 077 citations.)

PB80-852940 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Prefabricated Homes. June, 1970- June, 1980 (Citations from the Energy Data Base).
Rept. for Jun 70- Ma 80,
William V. Sassi. Aug 80, 30p
NERACEDBNT0310
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design, construction, economic advantages, and thermal performance of mobile and prefabricated homes. Also included are a few articles on the application of solar heating and cooling of such housing. (Contains 024 citations.)

PB80-859218 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Prefabricated Homes. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jul 80, 88p NERACUSGNT0310
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the design, construction, economic advantages and social implications of mobile and prefabricated housing. The possibility of prefabricated homes as a solution to the current housing shortage is also included. (Contains 071 citations.)

14. METHODS AND EQUIPMENT

14A. Cost Effectiveness

AD-A088 476/7 PC **A09**/MF **A01**
Hughes Aircraft Co Canoga Park CA
Predictive Software Cost Model Study. Volume I. Final Technical Report.
Final rept. 2 Apr 79-2 Jun 80,
Richard B. Waina, Gary L. Foreman, Alan P. Bangs, James L. Green, and Esperanza E. Rodriguez. Jun 80, 181p AFWAL-TR-80-1056-VOL-1
Contract F33615-79-C-1734
See also Volume 2, AD-A088 477.

Current cost estimating techniques do not adequately address the problem of predicting avionics embedded software support costs. This limitation results primarily from an inadequate understanding of how those costs are generated and from a scarcity of historical data on avionics software support and the resultant costs. The objectives of this Phase I study of the Predictive Software Cost Model (PSCM) program were to determine the feasibility of a model to predict those costs and to generate a roadmap for development of such a model. The feasibility of such a model was established. It will include the six key resource types required to support avionics software: personnel, support hardware, support software, facilities (buildings), program documentation and flight test aircraft/ranges. Some preliminary estimating relationships were identified. A detailed roadmap for developing the model was generated. Phase II of the PSCM program will provide an operating model for predicting avionics embedded software support costs.

AD-A088 477/5 MF **A01**
Hughes Aircraft Co Canoga Park CA
Predictive Software Cost Model Study. Volume II. Software Package Detailed Data.
Final rept. 2 Apr 79-2 Jun 80,
Richard B. Waina, Alan P. Bangs, and Esperanza E. Rodriguez. Jun 80, 517p AFWAL-TR-80-1056-VOL-2
Contract F33615-79-C-1734
See also Volume 1, AD-A088 476.
Availability: Microfiche copies only.

For abstract see AD A088 476.

14B. Laboratories, Test Facilities, and Test Equipment

AD-A088 014/6 PC **A02**/MF **A01**
California Univ Berkeley Operations Research Center
Accelerated Life Tests and Information.
Research rept.,
Richard E. Barlow. Jun 80, 20p Rept no. ORC-80-14
Grant AFOSR-77-3179

This is a partly philosophical discussion of the problems of conducting accelerated life test experiments and analyzing data from such experiments. Our objective is to predict life at a specified stress level. The concept of information is presented and its quantification via entropy discussed.

AD-A088 018/7 PC **A03**/MF **A01**
Stanford Univ CA Dept of Operations Research
An Early-Accept Modification to the Test Plans of Military Standard 781C.
Technical rept.,
David A. Butler, and Gerald J. Lieberman. 17 Jun 80, 31p Rept no. TR-196
Contracts N00014-75-C-0561, N00014-79-C-0751

Military Standard 781C, 'Reliability Design Qualification and Production Acceptance Tests: Exponential Distribution' covers the requirements for reliability qualification tests (pre-production) and reliability acceptance tests (production) for equipment that experiences a distribution of times-to-failure that is exponential. These requirements include: test conditions, procedures, and various fixed-length and sequential test plans with respective accept/reject criteria. This paper is concerned only with the statistical test plans and the selection and use of these plans. (Author)

AD-A088 033/6 PC **A07**/MF **A01**
Bolt Beranek and Newman Inc Canoga Park CA
Development of NOISECHECK Technology for Measuring Aircraft Noise Exposure.
Final rept.,
Peter E. Rentz, and Harry Seidman. May 80, 140p BBN-3862, AMRL-TR-78-125
Contract F33615-77-C-0514

This report describes a program to develop instrumentation for use by Air force personnel to make spot checks of the noise exposure at locations in and about air bases. These instruments combined with standardized field measurement procedures form a technology, termed NOISECHECK, which provides a means for measuring the noise environment and checking daily average noise level values (DNL's) calculated by the Air Force NOISEMAP community-aircraft noise prediction program. (Author)

AD-A088 047/6 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Use of a Photoionization Detector as a Hydrocarbon Trace Gas Analyzer.
Memorandum rept.,
D. Spain, J. J. DeCorpo, and J. R. Holtzclaw. 13 Aug 80, 20p Rept no. NRL-MR-4239

A portable photoionization detector is being evaluated as a submarine Hydrocarbon Gas Trace Analyzer (TGA). Principles of the photoionization technique and the physical features of the instrument are discussed, and the utility of this instrument as an onboard hydrocarbon analyzer is compared to the Total Hydrocarbon Analyzer (THA) currently deployed on all SSBN's and all 688 Class SSN's. Theoretical and laboratory evaluations show the TGA to be easier to operate, more simple in design and potentially more reliable than the THA. Final conclusions regarding suitability of the TGA as a shipboard hydrocarbon analyzer will be reached following sea trials that are now underway.

AD-A088 051/8 PC **A03**/MF **A01**
Naval Research Lab Washington DC
A Study of Power and Energy in the Aurora Modification Project.
Final rept.,
John D. Shipman, Jr. 23 Jul 80, 28p Rept no. NRL-MR-4281

This report summarizes the results of a series of computer runs at NRL which were designed to determine if the measured loss of power and energy in the Aurora Modification Project tests in the Fall of 1978 was due to increasing capacitance in the water switches during the transit times of the streamers or was due to resistive losses in the water switches. From the results of these analyses, it is concluded that the losses were mainly due to resistance in the intermediate store and pulse forming liner output switches and that the changing switch capacitance mainly rounded the pulse shapes near the peak values without contributing to a major loss of energy. It is suggested that oil switches be considered as a replacement for the water switches since they have less loss, although there are risks and problems involved in their use. (Author)

AD-A088 177/1 PC **A07**/MF **A01**
Sperry Rand Corp Huntsville AL Sperry Support Services
Automatic Test Equipment,
Final rept.
28 Feb 80, 149p SP-212-1055, DRSMI/RL-CR-80-3, AD-E950 018
Contract DAAK40-79-D-0020

This report presents an overview of recent activities within Industry and the Department of Defense on Automatic Test Equipment (ATE). A review of ad hoc projects both within the services and jointly with industry is presented beginning with the Electronic Test Equipment Task Force established in 1974. A brief description of the major ATE systems in use by the Navy and Air Force together with a more detailed description of existing and planned Army ATE is presented. The report concludes with the need to emphasize Built-In Test Equipment in future Army missile systems. (Author)

AD-A088 206/8 PC **A05**/MF **A01**
Army Missile Command Redstone Arsenal AL Ground Equipment and Missile Structures Directorate
Flaw Detection and Evaluation of Composite Cylinders Using Laser Speckle Interferometry and Holography.
Technical rept.,
Terry L. Vandiver. 23 Nov 79, 88p DRSMI/RL-80-7-TR, AD-E950 017

The objective of this work was to determine what constitutes a flaw in a composite tube. Speckle interferometry and holography were used to measure surface displacements of 108 fiber reinforced thin wall cylinders. E-glass, S-glass and Keviar fibers were used. Cut fiber and impact flaws were investigated. A new automated laser speckle interferometry displacement contour analyzer was used in conjunction with a computer for data analysis. The system analyzes 5000 data points in less than four minutes. Full field reconstruction of laser speckle interferograms and holograms is presented. The techniques described give the investigator a full field displacement picture of the flawed structures as well as displacement data that can be used to determine stresses and strains. (Author)

AD-A088 279/5 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
A One-Pass Method for Counting Range Mean Pair Cycles for Fatigue Analysis,
R. C. Fraser. Jun 79, 40p Rept no. ARL/STRUC NOTE-454

A one pass method for counting Range Mean Pair cycles is described. The Range Mean Pair Table which is used to represent the data generated by the method is considered with reference to its use in fatigue analysis. (Author)

AD-A088 281/1 PC **A02**/MF **A01**
Materials Research Labs Ascot Vale (Australia)
A 10 Meganewton (1000 tonf) Force Standard,
E. Raymond Harrison, and Frederick J. Brown.
Mar 80, 18p Rept no. MRL-R-768

Calibration of a force-testing machine allows it to be used as a 10-MN force standard for the testing of elastic-force calibrating devices to an accuracy of 0.2 per cent, this limitation being caused by friction of the machine's ram. (Author)

AD-A088 359/5 PC **A13**/MF **A01**
All American Engineering Co Wilmington DE
Feasibility and Conceptual Design Study to Add a Deadload Test Capability to the Aircraft Arresting System Complex at Edwards Air Force Base.
Final rept. Feb-Sep 70,
George C. McIntosh, and Milton O. Wood. May 71, 290p AFFTC-TR-70-21
Contract F04611-70-C-0030

A feasibility and design study was conducted to provide design requirements and cost estimates for a proposed expansion of the existing Air Force capability for testing aircraft arresting systems and hooks at the Air Force Flight Test Center (AFFTC) Arresting Systems Test Complex. There is no facility within the Department of Defense or industry other than the AFFTC which is capable of being expanded at minimal cost to satisfy the high speed, heavy weight test requirements which must be met during the next decade. A requirement now exists for the development and subsequent testing of one or more high energy arresting gear systems capable of arresting aircraft at engaging speeds of 235 knots. The primary purpose of this study is to define facility requirements and a safe method of testing and evaluating high energy arresting gear systems between the presently obtainable 170 knots and the required 235 knots. This study proposes the use of unmanned test vehicles, called deadloads, to be used above the speed range considered safe for live, manned aircraft test operations, and a facility with a total energy capability 10 to 12 times the capability of any existing facility in this country.

AD-A088 360/3 PC **A04**/MF **A01**
Dayton Univ OH
Tri-Service Thermal Flash Test Facility. Summary Report.
Final rept. 15 Dec 78-15 Dec 79,
Benjamin H. Wilt, Ronald A. Servais, and Nicholas J. Olson. 15 Jan 80, 51p UDR-TR-80-03, DNA-5197F, AD-E300 876
Contract DNA001-79-C-0106

This report describes the status of the Tri-Service Thermal Nuclear Flash Test Facility. It describes the improvements in facility capabilities that were incorporated during the the past 12 months to enhance thermal flash simulation. The report also summarizes all tests for the continuation of a comprehensive data base. (Author)

AD-A088 366/0 PC **A03**/MF **A01**
Los Alamos Technical Associates Inc NM
Feasibility of a Passive Thermal Radiation Fluence Transducer.
Final rept. 4 Dec 78-31 Jul 79,
Peter S. Hughes. 31 Jul 79, 32p LATA-94, DNA-5003F, AD-E300 881
Contract DNA001-79-C-0092

A feasibility and exploratory development program is described for a simple passive thermal fluence transducer that provides high quality quantitative data or radiative heat sources. The feasibility is demonstrated by field test experiments for an inexpensive, passive recording transducer that augments and may replace expensive electronic calorimeters. These transducers are intended to provide post-test quick-look information on the incident heat from various nuclear thermal radiation simulators. (Author)

AD-A088 409/8 PC **A03**/MF **A01**
Army Armament Research and Development Command Dover NJ Fire Control and Small Caliber Weapon Systems Lab
A Comparison of Residual Stress Measuring Techniques: Their Strengths and Weaknesses.
Special publication,
Fred M. Witt, Fee M. Lee, and Walter M. Rider.
Aug 80, 30p ARSCD-SP-80001, AD-E400 457

Ongoing in-house work on the measurement of residual stress in Army Materiel by both X-ray and strain gage mechanical relaxation methods is presented and compared. The X-ray portion includes problems associated with the calculation of stresses in highly textured samples while the strain gage portion describes effects produced by various mechanical methods to partially relieve the strain fields sensed by the active gage elements. Comparisons are also made of the errors introduced by considering the active element in the strain gage rosette as a point gage instead of one with finite length.

BNL-28015 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Temperature Effects in Dip-Tube Manometry.
B. Keisch, and S. Suda. 1980, 13p CONF-800655-28
Contract AC02-76CH00016
21. annual meeting of the Institute of Nuclear Materials Management, Palm Beach, FL, USA, 30 Jun 1980.

A simple mathematical treatment of the temperature dependence of manometric data for dip-tubes is described. It is shown that the pressure probe measurement is a function of the mass, temperature, and liquid level heights below and above the effective tip of the probe. The resulting equations explain why, for example, high- and low-level probes exhibit temperature sensitivity that is opposite in sign to one another. The derived equations are successful in the prediction of actual data obtained for two differently-shaped vessels containing two different liquids. (ERA citation 05:029558)

CEA-CONF-4592 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Equipment and Performance of the Q3D Spectrometer Installed at the Tandem Laboratory of Saclay.
B. Berthier. 1979, 27p CONF-7903121-1
Use of magnetic spectrometers in nuclear physics study weekend, Daresbury, UK, 10 Mar 1979.
U.S. Sales Only.

A variety of heavy ion induced reactions has been studied with the Q3D spectrometer, examples are given. The proportional counter has shown a great ability to identify masses up to A=24 at energies greater than 20 MeV. For lower energies and heavier masses the resolution of the residual energy signal get worse due to the fact that almost all the energy of the particles is lost in the intermediate mylar foil. This is a limitation in the use of the proportional counter. In order to improve the detection along the focal surface we decided to build a detector with the following properties: - a clean geometry without any intermediate foils, - Esub(total) information with a good resolution instead of a residual energy information, - improved delta E resolution, - wider energy range, 16% instead of approximately 10%, - measurement of the vertical position. The improvements presented above will allow to detect heavier masses and less energizing ions with a better energy resolution. (Atomindex citation 11:507514)

CEA-CONF-4612 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services d'Electronique.
Comparative Study of on-Line Response Time Measurement Methods for Platinum Resistance Thermometer.
G. Zwingelstein, P. Cormault, J. P. Jacquot, J. C. Authier, and B. Giret. 1979, 9p CONF-790525-3 IMEKO congress, Moscow, USSR, 21 May 1979.
U.S. Sales Only.

This study deals with the in site determination of the response time of platinum resistance sensor. In the first part of this work, two methods furnishing the reference response time of the sensors are studied. In the second part of the work, two methods obtaining the response time without dismounting of the sensor, are studied. A comparative study of the performances of these methods is included for fluid velocities varying from 0 to 10 m/sec, in both laboratory and plant conditions. (Atomindex citation 11:509261)

JAERI-M-8073 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Online Data Processing System. Pulse Height Analyzer Terminal System (PHATS).
Y. Nakahara, H. Yagi, and T. Yamada. Feb 79, 105p
In Japanese.
U.S. Sales Only.

A pulse height analyzer terminal system PHATS has been developed for online data processing via JAERI-TOKAI computer network. The system is controled by using a micro-computer MICRO-8 which was developed for the JAERI-TOKAI network. The system program consists of two subprograms, online control system ONLCS and pulse height analyzer control system PHACS. ONLCS links the terminal with the conversational programming system of FACOM 230/75 through the JAERI-TOKAI network and controls data processing in TSS and remote batch modes. PHACS is used to control INPUT/OUTPUT of data between pulse height analyzer and cassette-MT or typewriter. This report describes the hardware configuration and the system program in detail. In the appendix, explained are real time monitor, type of message, PEX to PEX protocol and Host to Host protocol, required for the system programming. (Atomindex citation 11:497473)

JEN-417 PC **A04**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Principles and Techniques of gamma Ray Tracers.
K. T. Claxton. 1978, 60p
In Spanish.
U.S. Sales Only.

Radioactive tracer techniques provide a very sensitive means of studying physical and chemical processes in a whole variety of different media. Some of the techniques and principles of radioactive tracers and their application to practical engineering systems are discussed. Information which has been found useful in the design of high temperature liquid sodium facilities employing radiotracers, is presented. The report deals solely with the use of gamma-emitting species as the tracer. These find particular application for in-situ studies on engineering systems where the highly penetrating properties of gamma rays are needed for detection through strongly absorbent media such as stainless steel pipe walls. (Atomindex citation 09:408312)

JINR-R-9-12378 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Study on the Two-Dimensional Magnetic Fields by the Harmonic Analysis Method. 2. Pt. Measuring Coils.
M. A. Voevodin, and A. D. Kovalenko. 1979, 18p
In Russian.
U.S. Sales Only.

Different types of induction coils which may be used as monitors at the investigation of two-dimensional magnetic fields by the harmonic analysis method are described. Expressions for infinitely thin coil sensitivity coefficient calculation are given. Based on the condition of achieving maximum and uniform sensitivity on all harmonics to be measured, weak sensitivity dependence on construction errors, simplicity of designing and alignment, some conclusions as to advantages of using different induction coils are made. Optimal values of main constructive parameters and limitations of their variations are computed. (Atomindex citation 11:509260)

LBL-10992 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Optical Multichannel Analyzer Techniques for High Resolution Optical Spectroscopy.
J. L. Chao. Jun 80, 100p
Contract W-7405-ENG-48
Thesis.

The development of optical multichannel analyzer techniques for UV/VIS spectroscopy is presented. The research focuses on the development of spectroscopic techniques for measuring high resolution spectral lineshape functions from the exciton phosphorescence in H sub 2 -1,2,4,5-tetrachlorobenzene. It is found that the temperature dependent frequency shifts and widths confirm a theoretical model based on an exchange theory. The exchange of low energy phonon modes which couple with excited state exciton transitions is shown to display the proper temperature dependent behavior. In addition to the techniques for using the optical multichannel analyzer (OMA) to perform low light level target integration, the use of the OMA for capturing spectral information in transient pulsed laser applications is discussed. An OMP data acquisition system developed for real-time signal processng is described. Both hardware and software interfacing considerations for control and data acquisition by a microcomputer are described. The OMA detector is described in terms of the principles behind its photoelectron detection capabilities and its design is compared with other optoelectronic devices. (ERA citation 05:031097)

N80-29374/9 PC **A03**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
A Proposal for Aerodynamically Actuated Self Streamlining Subsonic Wind Tunnel Walls.
N. Pollock. Jun 79, 27p ARL-AERO-NOTE-392, AR-001-739

An arrangement is described which ensures that solid flexible two dimensional subsonic wind tunnel walls will automatically and continuously assume a shape approximating an unconstrained streamline under the action of a model pressure field. Such a tunnel wall would minimize interference. Each wall consists of a streamwise tensioned membrane with a series of pressure tappings. These pressure tappings communicate with a number of flexible bellows which apply appropriate local forces to the membrane. Methods covering the extension of this concept to a three dimensional configuration are also discussed.

N80-29636/1 PC **A05**/MF **A01**
Information and Control Systems, Inc., Hampton, VA.
A Parametric Study of Aliasing Error for a Narrow Field of View Scanning Radiometer.
Final Report.
N. Halyo, and S. T. Stallman. Aug 80, 81p NASA-CR-3294, FR-47801

Starting from the general measurement equation, it is shown that a NFOV scanner can be approximated by a spatially invariant system whose point spread function depends on the detector shape and angular characteristics and electrical filter transfer function for given patches at the top of the atmosphere. The radiometer is modeled by a detector, electrical filter, analog to digital converter followed by a reconstruction filter. The errors introduced by aliasing and blurring into a reconstruction of the input radiant exitance are modeled and analyzed for various detector shapes, sampling intervals, electrical filters and scan types. Quantitative results on the errors introduced are presented showing the various tradeoffs between design parameters. The results indicate that proper selection of detector shape coupled with electrical filter can reduce aliasing errors significantly.

N80-29643/7 PC **A05**/MF **A01**
Bonn Univ. (Germany, F.R.). Inst. fuer Astrophysik und Extraterrestrische Forschung.
Investigations on the Layout of a He(+) Resonance Cell.
Final Report.
H. G. Hamacher. Oct 79, 100p BMFT-FB-W-79-14
Contract BMFT-WRT-1074/1076
Text in German; English Summary.

A resonance cell working with singly charged helium ions as resonant absorbers is proposed as an instrument for the high resolution analysis of helium-2 304 A radiation. Methods to ionize helium in a helium resonance cell are investigated. It is found that only ionization by energetic electrons promises the realization of sufficiently high ion densities for an effective modulation of the helium-2 304 A radiation. High frequency ionization is shown to be much more effective than ionization by static-field-accelerated electrons. Two types of resonance cells were built, one for a capacitive and one for an inductive high frequency energy coupling. The latter type of cell is demonstrated superior for the purpose of reaching high ion densities. Realized ion densities above 30 billion/cu cm, yielding a 5 to 10% modulation of the helium-2 304 A radiation traversing the cell are reported. Possibilities to improve the technical layout of the cells that were tested experimentally are discussed.

PAT-APPL-6-092 154 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Digital Pressure Transducer for Use at High Temperatures.
Patent Application,
H. H. B. Karplus. Filed 7 Nov 79, 9p
Contract W-31-109-ENG-38
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A digital pressure sensor for measuring fluid pressures at relatively high temperatures includes an electrically conducting fiber coupled to the fluid by a force disc that causes tension in the fiber to be a function of fluid pressure. The tension causes changes in the mechanical resonant frequency of the fiber, which is caused to vibrate in a magnetic field to produce an electrical signal from a positive-feedback amplifier at the resonant frequency. A count of this frequency provides a measure of the fluid pressure. (ERA citation 05:032742)

PATENT-4 208 920
Not available NTIS
Department of Agriculture, Washington, DC.
Automatic Spinning Strength Tester.
Patent,
John S. Graham. Filed 30 Apr 79, patented 24 Jun 80, 8p PB80-214752, PAT-APPL-6-034 881
Supersedes PB-297 897.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An apparatus for automatically testing the breaking strength of textiles during the spinning process is disclosed. A yarn clamping means affixed to a breaking assembly is rotatably mounted to an automatic timer which is pre-programmed to break yarn at set intervals. The spinning yarn is passed through a tension sensing device which measures the strength of the yarn at the breaking point, after the clamping means rotates, catches, and breaks the yarn. The clamping means then rotates back to the original position and restores and recombines the yarn as new feed yarn.

PATENT-4 210 401
Not available NTIS
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Visible and Infrared Polarization Ratio Spectroreflectometer.
Patent,
C. E. Batten. Filed 28 Jul 78, patented 1 Jul 80, 11p N80-28687/5, PAT-APPL-929 087
Supersedes PAT-APPL-929 087-78, N78-32398 (16 - 24, p 3179).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

The instrument assists in determining the refractive index and absorption index, at different spectral frequencies, of a solid sample by illuminating the sample at various angles in incidence and measuring the corresponding reflected intensities at various spectral frequencies and polarization angles. The ratio of the intensity of the reflected light for parallel polarized light to that for perpendicular polarized light at two different angles of incidence can be used to determine the optical constants of the sample. The invention involves an apparatus for facilitating the utilization of a wide variety of angles of incidence. The light source and polarizing element are positioned on an outer platform; the sample is positioned on an inner platform. The two platforms rotate about a common axis and cooperate in their rotation such that the sample is rotated one degree for every two degrees of rotation of the light source. This maintains the impingement of the reflected light upon the detector for any angle of incidence without moving or adjusting the detector which allows a continuous change in the angle of incidence.

PATENT-4 213 051
Not available NTIS
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Dual Acting Slit Control Mechanism.
Patent,
G. L. Struthoff. Filed 8 Sep 78, patented 15 Jul 80, 4p N80-28686/7, PAT-APPL-940 689
Supersedes PAT-APPL-940 689-78, N78-32399 (16 - 23, p 3081). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A dual acting control system for mass spectrometers is described, which permits adjustment of the collimating slit width and centering of the collimating slit while using only one vacuum penetration. Coaxial shafts, each with independent vacuum bellows are used to independently move the entire collimating assembly or to adjust the slit dimension through a parallelogram linkage.

PB80-216443 Not available NTIS
National Bureau of Standards, Washington, DC.
Corrections to the Faraday as Determined by Means of the Silver Coulometer.
Final rept.,
R. S. Davis, and V. E. Bower. 1980, 5p
Pub. in Proceedings of Conference on Atomic Masses and Fundamental Constants (6th) (AMCO-6), East Lansing, Michigan, September 18-21, 1979, Paper in Atomic Masses and Fundamental Constants, p161-165 1980.

At the last meeting of the conference on Atomic Masses and Fundamental Constants (AMCO-5) experimental results for the Faraday constant as determined by the silver coulometer were presented. Those results included an uncertainty estimated at 2 ppm due to impurities in the silver. The authors are now able to assign an impurity correction based on exhaustive mass spectrographic analysis of the silver used and assumptions concerning the elctrochemical behavior of the impurities. A realistic assignment of uncertainty of the impurity correction has also been obtained. The overall correction has lowered the value of the Faraday reported at AMCO-5 by 2 ppm while reducing the uncertainty due to impurities to 0.5 ppm. The authors believe the impurity analysis to be the most searching ever performed for an electrical determination of the Faraday constant.

PB80-218498 Not available NTIS
National Bureau of Standards, Washington, DC.
Reference Wavelength. Infra-red to Gamma-Rays, Avogadro's Constant, Mass and Density.
Final rept.,
R. D. Desiattes. Aug 80, 66p
Pub. in Proceedings of the Course LXVIII 'Metrology and Fundamental Constants' Summer School of Physics-Enrico Fermi, Varenna, Italy Jul 76, p38-113 1980.

The accompanying text reflects, with subsequent revision, lecture notes distributed at the course. These notes represent the most complete and up-to-date summary of the entire range of the activities in the field of fundamental constants type work over the past decade.

PB80-221963 PC **A05**/MF **A01**
Battelle Columbus Labs., OH.
Diesel Engine Emissions of Particulates and Associated Organic Matter.
Annual rept. no. 1,

Bruce A. Petersen, Cheng C. Chuang, Glenn W. Kinzer, Patrick W. Meehan, and Ralph M. Riggin.
14 Jul 80, 84p

The objective of this phase of the CAPE-24 program was to develop and validate an analytical method for the analysis of PNA in diesel exhaust particulate. The first year of work included construction of a test engine facility, development of an analytical method for the measurement of PNA, and development of an exhaust tracer injection methodology. The method for the analysis of PNA in diesel exhaust was developed based on the use of stable isotopically labeled PNA as exhaust tracers. A tracer PNA injection method was developed to introduce the tracer PNA to the undiluted exhaust as vapors to insure that the tracer PNA would be subjected to the same temperature and dilution profile as the engine exhaust. Analysis of particulate filter samples indicate that the quantity of engine PNA was much lower than the quantity used to evaluate the analytical method. Although the analytical method was capable of analyzing the engine BaP, the method must still be evaluated for precision and accuracy using levels of PNA equal to the quantities measured in the particulate.

PB80-228976 Not available NTIS
National Bureau of Standards, Washington, DC.
Innovation and U. S. Research Problems and Recommendations.
Final rept.,
W. N. Smith, and C. F. Larson. 1980, 11p
Pub. in Proceedings of the Meeting of the American Chemical Society (178th), Washington, DC., 9-14 Sep 79, ACS Symposium Series 129, p159-169 1980.

The talk covers experiences at the National Bureau of Standards during World War II and the years immediately following. It compares the administration of R&D at NBS and other Government laboratoeies with that period and the present day. The talk also touches on the present situation in the management of industrial R&D and points out some of the difficulties with management which is excessively oriented to short-term pay-off.

PB80-850324 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rheometry. February, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Feb 70-Jun 80,
Howard L. Ogushwitz. Jul 80, 205p NERACEI NT0247
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles include a discussion of experiments with various fluids, as well as a description of the instruments used in density, viscosity, and other rheometric measurements. (Contains 200 citations.)

PB80-850985 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Airborne Magnetometers. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Aug 80, 53p
NERACIAANT0323
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles discuss the design and development of magnetometers in aircraft. Their use in aeromagnetic surveying, and other applications, are also discussed. (Contains 062 citations.)

PB80-852346 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Viscometry. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 81p
NERACIAANT0613
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the various methods and instruments used in the measurement of viscosity. A description of the design, test, development, and application of the state-of-the-art viscosimeters is also included. (Contains 056 citations.)

PB80-852353 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Viscometry. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 110p
NERACUSGNT0613
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the various methods and instruments used in the measurement of viscosity. A description of the design, test, development, and application of the state-of-the-art viscosimeters is also included. (Contains 083 citations.)

PB80-852361 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Viscometry. July, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jul 76-May 80,
Howard L. Ogushwitz. Jun 80, 88p
NERACEDBNT0613
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the various methods and instruments used in the measurement of viscosity. A description of the design, test, development, and application of the state-of-the-art viscosimeters is also included. (Contains 064 citations.)

PB80-852379 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Viscometry. November, 1971-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Nov 71-Jun 80,
Howard L. Ogushwitz. Jun 80, 189p NERACEI NT0613
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the various methods and instruments used in the measurement of viscosity. A description of the design, test, development, and application of the state-of-the-art viscosimeters is also included. (Contains 170 citations.)

PB80-853021 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thermocouple Applications. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 33p
NERACUSGNT0295
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the application of thermocouples to such areas as spacecraft development, mineral exploration technology, gas-cooled reactor technology, and other related topics. (Contains 025 citations.)

PB80-853252 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ultrasonic Transducers. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 117p
NERACUSGNT0436
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, development, fabrication, and application of ultrasonic transducers. Among the applications included are, the inspection of solid objects using piezoelectric ultrasonic transducers, light modulation, materials testing and characterization. (Contains 108 citations.)

PB80-853278 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ultrasonic Transducers. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Aug 80, 80p
NERACEDBNT0436
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the characterization, design, development, and application the inspection of thick walled specimens, liquid-in-line detection, electron beam weld testing, non-destructive testing of electroconductive materials. (Contains 082 citations.)

PB80-853328 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ultrasonic Transducers. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
William V. Sassi. Aug 80, 72p NERACIAANT0436
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the characterization, design, development, and application of ultrasonic transducers. Among the applications included are, non-destructive inspection of aeronautical components, measurement of solid propellant burning rate, and the determination of weld defects. (Contains 060 citations.)

PB80-853765 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Particle Size Analysis. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 197p
NERACEDBNT0524
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which deal with the determination and analysis of particle-size in the atmosphere, aerosols, power plants, powders, fluidized beds and coal. (Contains 175 citations.)

PB80-854110 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Particle Size Analysis. July, 1972-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jul 72-Jun 80,
Lawrence H. Marcus. Jun 80, 215p
NERACUSGNT0524
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which deal with the determination and analysis of particle-size in the atmosphere, aerosols, powders and propellants. (Contains 200 citations.)

PB80-854128 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Particle Size Analysis. August, 1975-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Aug 78-Jun 80,
Lawrence H. Marcus. Jun 80, 209p NERACEI NT0524
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which discuss techniques for analyzing and determining particle size of aerosols, powders, air pollutants, dust and in the atmosphere. (Contains 192 citations.)

PB80-854508 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radiometers. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,

Howard L. Ogushwitz. Jun 80, 125p
NERACIAANT0610
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the design, and application of radiometers. Also included are the application of radiometry to various topics such as, solar radiation measurements, critical temperature measurements, and infrared surveying. (Contains 095 citations.)

PB80-854516 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radiometers. April, 1978-June, 1980 (Citations from the NTIS Data Base).
Rept. for Apr 78-Jun 80,
Howard L. Ogushwitz. Jun 80, 223p
NERACUSGNT0610
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the design, and application of radiometers. Also included are the application of radiometry to various topics such as, solar radiation measurements, critical temperature measurements, and infrared surveying. (Contains 172 citations.)

PB80-854524 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radiometers. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 200p
NERACEDBNT0610
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the design, and application of radiometers. Also included are the application of radiometry to various topics such as, solar radiation measurements, critical temperature measurements, and infrared surveying. (Contains 137 citations.)

PB80-854532 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radiometers. April, 1977-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Apr 77-Jun 80,
Howard L. Ogushwitz. Jun 80, 200p NERACEI NT0610
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the design, and application of radiometers. Also included are the application of radiometry to various topics such as, solar radiation measurements, critical temperature measurements, and infrared surveying. (Contains 188 citations.)

PB80-854698 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Spectrometers. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 132p NERACUSGNT0815
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited on the applications of magnetic spectrometers to the detection and measurement of nuclear and other subatomic particles from various sources and in a number of physical media. (Contains 060 citations.)

PB80-854706 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Spectrometers. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 202p NERACEDBNT0815
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited on the applications of magnetic spectrometers to the detection and measurement of nuclear and other subatomic particles from various sources and in a number of physical media. (Contains 140 citations.)

PB80-856800 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rheometry. January, 19- -May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan - -May 80,
Howard L. Ogushwitz. Aug 80, 40p
NERACIAANT0247
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss various experiments done with fluids. Also included is a description of the instruments used in density, viscosity, and other rheometric measurements. (Contains 026 citations.)

PB80-856818 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rheometry. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jul 80, 31p
NERACUSGNT0247
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss various experiments done with fluids. Also included is a description of the instruments used in density, viscosity, and other rheometric measurements. (Contains 021 citations.)

PB80-856842 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Nondestructive Testing Methods. March, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Mar 76-May 80,
William V. Sassi. Jun 80, 200p
NERACEDBNT0361
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory, methods, and application of nondestructive testing techniques in industry and scientific research. Among the applications discussed is the detection of cracks on metal surfaces, evaluation of airport pavements, and weld analysis. (Contains 200 citations.)

PB80-857071 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Liquid Flow Meters. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 91p
NERACUSGNT0486
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the design, operation, evaluation of performance, and development of various types of liquid flow meters. Also included is a discussion of the application of flow meters in the measurement of blood flow, mobile source mass emissions, and liquid metal flows. (Contains 087 citations.)

PB80-857089 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Liquid Flow Meters. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Aug 80, 64p
NERACEDBNT0486
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the design, and evaluation of performance of various types of liquid flow meters. Also included is a discussion of the application of flow meters in the measurement of liquid metal flow, gas flow, and blood flow. (Contains 056 citations.)

PB80-857097 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Liquid Flow Meters. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
William V. Sassi. Aug 80, 76p NERACIAANT0486
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the design, evaluation of performance, and calibration of various types of liquid flow meters. Also included is a discussion of the application of flow meters in the measurement of liquid hydrogen, cloud liquid content, and blood flow. (Contains 073 citations.)

PB80-857105 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Liquid Flow Meters. November, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Nov 70-Jun 80,
William V. Sassi. Aug 80, 181p NERACEI NT0486
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the design, operation, evaluation of performance, and development of various types of liquid flow meters. Also included is a discussion of the application of flow meters in the measurement of chemical flow, liquid metal flow, and blood flow. (Contains 200 citations.)

PB80-857154 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Air Sampling Devices. March, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Mar 76-May 80,
William V. Sassi. Aug 80, 211p
NERACEDBNT0447
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, development and analysis of various types of air sampling devices. Among the applications discussed are atmospheric trace gases and trace element measurements, inhalable-dust samplers and radio-controlled air sampling systems for diffusion experiments. (Contains 200 citations.)

PB80-857725 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Position Sensing. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 89p
NERACIAANT0615
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, development, and application of various types of position sensing devices to such areas as, astronomy, adaptive optical systems, and the monitoring of angular rotation in mechanical devices. (Contains 052 citations.)

PB80-857782 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Particle Size Analysis. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Lawrence H. Marcus. Jun 80, 105p
NERACIAANT0524
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with techniques of determining particle size in the atmosphere, aerosols, flames and powders. (Contains 109 citations.)

PB80-859374 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Airborne Magnetometers. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Aug 80, 53p
NERACUSGNT0323
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles discuss the design and development of magnetometers in aircraft. Their use in aeromagnetic surveying, and other applications, are also discussed. (Contains 032 citations.)

PPGM-L-144-77 PC **A02**/MF **A01**
Gama Research Centre, Jogyakarta (Indonesia).
Timing Single Channel Analyzer.
M. Sudarti Siswohartoyo. 1977, 14p
U.S. Sales Only.

A modified version of A.M. Gottlieb's Timing Single Channel Analyzer is presented. The circuit, operation and the specification of the device will be discussed briefly. (Atomindex citation 11:508627)

RISO-M-2134 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Electronics Department Progress Report. Basic and Applied Research Activity 1975-1977.
Oct 78, 37p
U.S. Sales Only.

The electronics department at Risoe National Laboratory, Denmark, comprises about 80 people and is made up of essentially two main divisions. One deals with the provision of instrumentation and measurement expertise for the different groups at Risoe who conduct basic research or technological R and D. This division employs a group of scientific electronics consultants, a production group, a maintenance facility and a central instrument pool for the complete site. The other division, whose work is reported here, is engaged in both basic and applied research in topics and areas of direct interest to the department itself. These involve the development and evaluation of methods, for example, in the field of plant reliability and safety as well as in a group engaged in nuclear geophysical activities - including mineral prospecting in Greenland. Another team is working with man-machine problems in highly automated systems and the associated needs for computer support in connection with proper job allocation and design. Finally, a group is active in the field of applied laser physics. The time period covered is 1975-1977. (Atomindex citation 10:442223)

SAND-80-0975 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Microbalance Apparatus for Measuring Moisture Absorption and Desorption.
K. D. Boultinghouse. Jun 80, 17p
Contract AC04-76DP00789

An apparatus for measuring water absorption and desorption and environmental test condition over a saturated aqueous salt solution is described. The apparatus consists of a vacuum gravimetric microbalance and associated instrumentation. The apparatus can accommodate a specimen size of 2.54 cm x 2.54 cm x 10.16 cm and weight of 100 gm. The balance will respond to mass changes from near vacuum to positive pressure of 2 atmospheres. The maximum operating temperature of the system is 125 exp 0 C. As water is absorbed or desorbed by the specimen, the mass change and environmental data (temperature, pressure and dew point) are continuously collected in digital form. Desorption of the test specimen is performed under full vacuum; data from both tests can then be manipulated in a variety of ways and plotted. To demonstrate the utility of the apparatus, test procedures and data from the system are presented. Multiple tests measuring moisture diffusion in an epoxy resin casting (Ferro CE-9000) indicate that the system is capable of accurately measuring rates of diffusion as low as 8.18 x 10 exp -10 cm exp 2 /s. The principal advantages of this apparatus are continuous recording of moisture mass change versus time, sensitivity of mass measurement, a continuously monitored test environment and the ability to study both absorption and desorption of the test material without its removal from the test environment. (ERA citation 05:031098)

14C. Recording Devices

AD-A088 187/0 PC **A06**/MF **A01**
Ampex Corp Redwood City CA Advanced Technology Div
Recording Media Archival Attributes (Magnetic).
Final technical rept. 30 May 78-30 Nov 79,
Neal Bertram, and A. Eshel. Apr 80, 123p RR-80-01, RADC-TR-80-123
Contract F30602-78-C-0181

This study focuses on the long term (10-15 year) storage effects on magnetic recording media with emphasis on digital magnetic tape. Both the theoretical and experimental aspects are presented covering the primary magnetic, chemical, and mechanical considerations. Definite storage and handling procedures along with an optimum long term magnetic recording system are discussed. Conclusions are that long term storage is possible with magnetic tapes provided tight environmental controls are maintained and low acceleration rewinds are performed at a minimum interval of 3 1/2 years. (Author)

PB80-854250 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Recording Tape. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jun 80, 122p NERACIAANT0672
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the testing, analysis, calibration, and performance of different types of magnetic recording tapes, including metal tape and other magnetic materials. Cited applications for tapes include digital and magnetic data storage and sound reproduction. (Contains 123 citations.)

PB80-854268 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Recording Tape. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 201p NERACEI NT0672
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the testing, analysis, calibration, and performance of different types of magnetic recording tapes, including metal tape and other magnetic materials. Cited applications for tapes include digital and magnetic data storage and sound reproduction. (Contains 159 citations.)

PB80-854276 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Recording Tape. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 204p
NERACEDBNT0672
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the testing, analysis, calibration, and performance of different types of magnetic recording tapes, including metal tape and other magnetic materials. Cited applications for tapes include digital and magnetic data storage and sound reproduction. (Contains 047 citations.)

PB80-854441 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Recording Systems. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 78p NERACUSGNT0811
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports concerning computer and various other digital applications of magnetic recording systems are included in this retrospective bibliography. (Contains 175 citations.)

PB80-854458 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Recording Systems. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 33p NERACEI NT0811
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, development, and application of various types of magnetic recording systems. Also included is an analysis of group delay, layer loss, and the cross talk phenomenon associated with such devices. (Contains 029 citations.)

14D. Reliability

N80-29746/8 PC **A04**/MF **A01**
Sperry Univac, St. Paul, MN.
Study of Intermittent Field Hardware Failure Data in Digital Electronics.
E. J. Oneill, and J. R. Halverson. Jun 80, 68p
NASA-CR-159268
Contract NAS1-15574

The collection and analysis of data concerning intermittent dailures in digital devices was performed using data from a computer design for shipboard usage. The failure data consisted of actual field failures classified by failure mechanisms and their likelihood of having been intermittent, potentially intermittent, or hard. Each class was studies with respect to computer operation in the ranges of 0 to 2,000 hours, 0 to 5, hours, and 0 to 10,000 hours. The study was done at the computer level as well as the microcircuit level. Results indicate that as age increases, the quasi-intermittent failure rate increases and the mean time to failure descreases.

PB80-857998 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Mechanical Reliability. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 58p NERACEI NT0325
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the mechanical reliability of various mechanical devices, and the theory of mechanical reliability design. Also included is a discussion of the application of this technique to industrial machinery and electromechanical devices. (Contains 047 citations.)

PB80-858004 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Mechanical Reliability. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Aug 80, 55p
NERACEDBNT0325
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the mechanical reliability of various mechanical devices,

and the theory of mechanical reliability design. Also included is a discussion of the application of this technique to industrial machinery and electromechanical devices. (Contains 040 citations.)

PB80-858012 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Mechanical Reliability. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Aug 80, 38p NERACIAANT0325
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the mechanical reliability of various mechanical devices, and the theory of mechanical reliability design. Also included is a discussion of the application of this technique to industrial machinery and electromechanical devices. (Contains 031 citations.)

PB80-858020 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Mechanical Reliability. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 66p
NERACUSGNT0325
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the mechanical reliability of various mechanical devices, and the theory of mechanical reliability design. Also included is a discussion of the application of this technique to industrial machinery and electromechanical devices. (Contains 054 citations.)

PB80-858186 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Probabilistic Design for Reliability. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 21p NERACEI NT0327
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of probabilistic design to such design projects as nuclear component design, machine element design, and computer program design. (Contains 017 citations.)

PB80-858194 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Probabilistic Design for Reliability. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 21p
NERACEDBNT0327
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of probabilistic design to such design projects as nuclear component design, machine element design, and computer program design. (Contains 013 citations.)

PB80-858202 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Probabilistic Design for Reliability. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 11p NERACIAANT0327
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of probabilistic design to such design projects as nuclear component design, machine element design, and computer program design. (Contains 010 citations.)

14E. Reprography

PB80-850522 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ink-Jet Printing. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 35p NERACEI NT0301
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe equipment design and parts for various ink jet printing models. Other topics discussed include droplet, speed and image quality. Also reported are the applications of ink jet printing in industry and other areas. (Contains 031 citations.)

PB80-851223 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photochromic Materials. June, 1976-May, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Aug 80, 87p
NERACUSGNT0394
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which discuss studies of photochromic materials, their properties and their applications. Included are the uses of photochromic materials in optical equipment and systems, in imaging and display systems and in photochromic storage and retrieval systems. (Contains 077 citations.)

PB80-851231 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photochromic Materials. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 125p NERACEI NT0394
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography covers reports discussing photochromic materials, including studies and properties of photochromic glasses as well as photochromic polymers and other organic compounds, films, and ceramics. Photochromic materials for use in optical data storage are also presented. (Contains 140 citations.)

PB80-851249 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photochromic Materials. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Lawrence H. Marcus. Jun 80, 60p
NERACIAANT0394
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which discuss the applications of photochromic materials, including their use in optical data processing and storage, optical systems and equipment, holography and as photographic recording materials. (Contains 064 citations.)

PB80-851363 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Printing Inks. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Aug 80, 113p NERACEI NT0650
Sponsored in part by National Technical Information Service, Springfield, VA.

The reports from the worldwide literature cover applications of printing inks of various formulations with the different printing processes. Discussion on chemical and physical properties are given. Curing and drying technologies of printing inks are also included. (Contains 084 citations.)

PB80-852577 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fabric Printing. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 83p NERACEI NT0746
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on different printing techniques on natural or synthetic fabrics. The preparation of fabrics and curing of the various printing dyes are also discussed. (Contains 093 citations.)

PB80-852619 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
High-speed Photography. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jun 80, 70p NERACIAANT0741
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the high speed photography used in research and development and in the chemical, mechanical and physical movement of substances. (Contains 050 citations.)

PB80-852635 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
High-speed Photography. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 206p
NERACUSGNT0741
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the high speed photography used in research and development and in the chemical, mechanical and physical movement of substances. (Contains 140 citations.)

PB80-854888 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Transfer Printing. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 52p NERACEI NT0675
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide citations cover information on transfer printing on plastics, synthetic fabrics, textiles, coated fabrics, anodized aluminum and others. Various techniques and equipment are also included. (Contains 052 citations.)

15. MILITARY SCIENCES

15C. Defense

AD-A088 166/4 PC **A02**/MF **A01**
Department of National Defence Ottawa (Ontario) Research and Development Branch
Defence Research and Development and Industrial Preparedness, Presentation to Armed Forces Communications and Electronics Association 8 April 1980,
Edward J. Bobyn. Jun 80, 13p Rept no. CRAD-2/80
Abstract in French.

Discusses the role of defence-related research and development policy and programs as it affects the preparedness of Canada and its allies to be sensitive to the ever-changing threats to national security and to reduce the element of technological surprise. Suggestions are made for increased industrial participation in defence preparedness. (Author)

AD-A088 373/6 PC **A02**/MF **A01**
GARD Inc Niles IL
Adequacy of Wind Ventilation in Upgraded Shelters.
Final rept.,
R. Henninger, C. Krishnakumar, and R. Tsai. Jun 80, 11p Rept no. GARD-A1-11 (1713)
Contract DCPA01-78-C-0319

The objective of this study was to assess the adequacy of natural ventilation for application to upgrade shelters; i.e., shelters having full earth berms with at least 6 inches of earth overhead. It was realized that the wind induced ventilation air flow rate through a building is a complex function of several geometric and flow variables. Important among these variables are wind speed, wind direction, boundary layer profile of the approaching wind, building geometry, areas and locations of windows and doors, internal obstacles within the building, and the nature and proximity of neighboring buildings and obstructions. Data acquisition from experiments of full size buildings was considered expensive and time consuming. The approach taken therefore, was to conduct controlled tests on properly designed scaled model systems. A series of tests were designed to yield a clear understanding of the effects of the important variables individually, and in groups, on the ventilation airflow rates. The building geometry was kept relatively simple and internal flow resistances were excluded. Natural ventilation due to thermal effects were also ignored since the shelters were considered to be one story high. (Author)

AD-A088 421/3 PC **A08**/MF **A01**
Measurement Concept Corp Rome NY
Advanced Parallel Processing Techniques for I&W.
Final technical rept.,
Fred Tims, Penny Smith, Garry Caron, and Hank Spaanburg. May 80, 164p RADC-TR-80-119
Contract F30602-78-C-0190

This report summarizes work done to predict the performance of two target computer systems (ADCOM & PDSC) under varying loads and configurations. Interactive FORTRAN programs have been developed to predict performance of various hardware configurations for crisis workloads. New technology looked at for inclusion in various hardware configurations is included.

PB80-860034 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Security Devices. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 138p
NERACUSGNT0384
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information on security devices are cited. Topics on high security locks, alarm systems, and personnel detectors are also included. (Contains 140 citations.)

15E. Logistics

AD-A088 017/9 PC **A12**/MF **A01**
Stanford Univ CA Dept of Operations Research
Coherent System Repair Models.
Technical Rept.,
Randall E. Fleming. 16 Jun 80, 257p Rept no. TR-195
Contract N00014-75-C-0561

Consider a system which is composed of some number of subunits or components. The structure of the system is the relationship between the functioning of various components and that of the whole system. Structure can be specified completely in terms of the minimum cut sets of a system. These are sets of components for which: the system can't work if they are removed or failed, if any component in the min cut set is restored, then the system will work. (Author)

AD-A088 061/7 MF **A01**
Arizona State Univ Tempe Dept of Industrial and Management Systems Engineering
Development of an Effectiveness Planning and Evaluation Model for Air Force Maintenance Organizations.
Final scientific rept. 1 May 79-15 Feb 80,
Hewitt H. Young. 1 Apr 80, 216p ASU-ERC-R-80016, AFOSR-TR-80-0598
Grant AFOSR-79-0111
Availability: Microfiche copies only.

A preliminary effort was made to generate a survey-supported model which would (1) permit periodic evaluation of the performance effectiveness of an Air Force maintenance squadron and (2) highlight equipment and human resource factors which are contributing either positively or negatively to maintenance squadron performance. The model is generated from survey data, collected from a stratified sample of maintenance technicians and their shift supervisors, and processed by means of a stepwise, linear multiple regression statistical package to provide a performance prediction equation. Factors which surface as significant in the equation indicate positive and negative contributions to squadron performance effectiveness. The modeling effort is based on studies with the 82nd Air Training Command Wing at Williams AFB and the 405th Tactical Air Command Wing at Luke AFB, both in Arizona. The model was validated using immediate supervisor ratings of maintenance technician performance in speed and quality of work, averaged across a squadron. Based on the analyses and results of studies covering two maintenance squadrons at Williams AFB and three maintenance squadrons at Luke AFB, the model provides excellent predictions of squadron performance effectiveness and highlights significant contributing factors.

AD-A088 184/7 PC **A17**/MF **A01**
Science Applications Inc McLean VA
Military Organizational Effectiveness/Readiness and Sustainability.
Final rept. 30 Oct 78-30 Sep 79,
G. Ross, J. Murphy, M. March, R. Robinson, and B. Tullington. Sep 79, 381p
Contract DAAK21-79-C-0015

The U.S. Army's readiness policy as articulated in Army Regulation 220-1 was analyzed and the effectiveness of type combat battalions in various readiness conditions was measured. The purpose was to provide insights to improve readiness and replenishment policies by illuminating the relationship between resources and unit readiness and sustainability. The Analysis of Military organizational Effectiveness (AMORE) and methodology was applied to tank, mechanized, and artillery battalions to determine their capability to recover from the effects of a range of combat damage. Insights to improve readiness and replenishment policies to sustain forces are provided. (Author)

AD-A088 201/9 PC **A06**/MF **A01**
Lockheed-California Co Burbank
Availability/Operational Readiness Test Subsystem Cost Trade-Offs.
Final technical rept.,
Richard M. Loveless. May 80, 105p RADC-TR-80-182
Contract F30602-78-C-0179

This report describes the general test subsystem practices and tradeoff criteria that will make it possible for an equipment's or system's availability (or operational readiness) requirements to be met through the most cost effective usage of fault diagnosis/isolation/test subsystems that are used in conjunction with the maintenance of the equipment. The trade-off criteria are intended for use in planning the acquisition of new equipments and systems and to provide more accurate assessment of total life-cycle cost. (Author)

AD-A088 301/7 PC **A05**/MF **A01**
IBM Federal Systems Div Owego NY
Navy Computer Accreditation Study.
Final rept.
15 May 80, 94p Rept no. IBM-80-M28-001
Contract N00014-78-C-0986

This report documents 'The Navy Computer Accreditation Study' performed by the IBM Federal Systems Division for the Assistant Secretary of the Navy, Office of Naval Research, under Contract N00014-79-C-0986. The primary objectives of this study was for IBM to: Examine accreditation concept candidates; Define a meaningful policy and management framework for future Navy needs; Provide, where possible, specific details to put into the policy/management structure; Support the proposed accreditation approach with rationale and analysis.

AD-A088 472/6 PC **A09**/MF **A01**
Assistant Chief of Staff for Automation and Communications (Army) Washington DC
Alignment of Automation and Communications Functions of Army Agencies and Commands.
Final rept.
31 Jul 80, 193p

The study defines the current (May 1980) structure of the Army with respect to automation and communications organization and functions. Using this baseline, the study reports on specific problem areas which impact on the organization. Army subjects covered are policy, procedures, acquisition and interaction processes. (Author)

15G. Operations, Strategy, and Tactics

AD-A088 294/4 MF **A01**
Office of Air Force History Washington DC
The U.S. Air Service in World War I. Volume III. The Battle of St. Mihiel,
Maurer Maurer. 1979, 807p
Prepared in cooperation with the Albert F. Simpson Historical Research Center, Maxwell, AFB, AL.
See also Volume 2, AD-A064 767.
Availability: Superintendent of Documents, GPO, Washington, DC 20402. HC $12.00 Microfiche furnished to DTIC (and NTIS) users.

The Battle of St. Mihiel is of singular significance in the history of United States participation in World War I. It was the first battle in France in which an American army fought under the American flag. The U.S. offensive gained all objectives quickly and with relatively few casualties,. It eliminated a menacing salient that had threatened the Allied battleline for four years, and it cleared the way for new offensive that would end the war in less than two months. Aerial operations at St. Mihiel made the battle an important event in the history of U.S. Military aviation. It was, primarily, Col. William (Billy) Mitchell's show. He put together the largest air force ever committed to battle and drew up the plan for its employment. This volume presents documents relating to the role of U.S. aviation in the Battle of St. Mihiel. It is the third in a series of four volumes that the Office of Air Force History is publishing on the U.S. Air Service in World War I.

AD-A088 363/7 PC **A06**/MF **A01**
BDM Corp McLean VA
Theater Nuclear Force Survivability and Security. Measures of Effectiveness.
Final rept. 1 May-1 Nov 78,
L. B. Lennon, C. H. Hanks, and W. T. Cooper. 31 Jan 79, 125p BDM/W-78-664-TR, DNA-4821F, AD-E300 875
Contract DNA001-78-C-0290

This report describes the first phase of development of analytical assessment tools in support of the Department of Defense Theater Nuclear Forces Survivability and Security Program. An overall framework within which measures of effectiveness for theater nuclear force survivability and security can be used to judge the value of technological, operational, and procedural improvements is described. (Author)

AD-A950 017/4 PC **A06**/MF **A01**
Army Forces Far East Tokyo (Japan)
Japanese Studies on Manchuria. Volume V. Infantry Operations.
14 Dec 56, 108p
See also Volume 11, Part 3, Book A, AD-A950 018.

No abstract available.

AD-A950 018/2 PC **A07**/MF **A01**
Army Forces Far East Tokyo (Japan)
Japanese Studies on Manchuria. Volume XI. Part 3. Book A. Small Wars and Border Problems, The Changkufeng Incident.
9 Jul 56, 129p
See also Volume 11, Part 3, Book B, AD-A950 019.

No abstract available.

AD-A950 019/0 PC **A09**/MF **A01**
Army Forces Far East Tokyo (Japan)
Japanese Studies on Manchuria. Volume XI. Part 3. Book B. Small Wars and Border Problems, The Nomonhan Incident.
5 Sep 56, 182p
See also Volume 11, Part 3, Book C, AD-A950 020.

No abstract available.

AD-A950 020/8 PC **A12**/MF **A01**
Army Forces Far East Tokyo (Japan)
Japanese Studies on Manchuria. Volume XI. Part 3. Book C. Small Wars and Border Problems, The Nomonhan Incident.
5 Nov 56, 261p
See also Volume 11, Part 3, Book A, AD-A950 018.

No abstract available.

PB80-856321 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Operations Research Applied to Military Systems. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 104p NERACUSGNT1041
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the application of operations research and systems analysis to military operations, systems and logistics are contained in this retrospective bibliography. (Contains 085 citations.)

16. MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

AD-A088 222/5 PC **A10**/MF **A01**
Range Commanders Council White Sands Missile Range NM Documentation Group
Universal Documentation System Handbook. Volume 3. Program Support Plan and Operations Directive.
Final rept.
Nov 79, 219p Rept no. DG-501-79-VOL-3
See also Volume 1, AD-A087 072.

This handbook describes the Universal Documentation System (UDS). The UDS is used to formally document user agency test program support requirements and support agency capabilities and commitments to support those requirements. The UDS handbook is published in 3 volumes. Volume 1 describes the system, establishes general procedures for system initiation, and describes the procedure for preparing the Program Introduction (PI) and Statement of Capability (SC) documents. Volume 2 describes procedures for preparation of the Program Requirements Document (PRD) and the Operations Requirements (OR) document. This volume, Volume 3, describes procedures for preparation of the Program Support Plan (PSP) and the Operations Directive (OD) document.

16B. Missile Trajectories

AD-A088 129/2 PC **A03**/MF **A01**
Von Karman Inst for Fluid Dynamics Rhode-Saint-Genese (Belgium) Dept of Aerospace
Hypersonic Wind Tunnel Study of a 15 deg-30 deg Half Angle Concave Biconic Model Up to High Angles of Attack.
Final rept. 1 Dec 78-30 Nov 79,
Bryan E. Richards. Dec 79, 40p VKI-INTERNAL NOTE-62, AFOSR-TR-80-0629
Grant AFOSR-78-3474

Heat transfer and pressure measurements have been measured on a 15 - 30 deg half angle biconic model with a blunt nosetip in the von Karman Institute Longshot free piston tunnel at Mach 15 and 20 Reynolds numbers between one and five million based on model base diameter. The test flow parameter closely simulated re-entry aerodynamic conditions. The angle of attack of the model was varied from 0 to 20 deg. Information derived from the measurements and also schlieren pictures enabled understanding of the effects of Mach number, Reynolds number and flow incidence on the flow over the model and the location and size of heat transfer peaks. (Author)

AD-A088 130/0 PC **A02**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
The Effects on the Center of Pressure and the Static Margin of a TDU-34/A Target Vehicle of Six Different Nose Cone Afterbody Combinations.
Final rept.,
Samuel Greenhalgh. 10 May 79, 20p Rept no. NADC-80045-60

Calculations were made to determine the effects on the aerodynamics of six different nose cone afterbody combinations. The highest static stability margin is provided by a short nose cone on the basic 'x' fin body without the boat tail afterbody. (Author)

AD-A088 272/0 PC **A06**/MF **A01**
Naval Surface Weapons Center Silver Spring MD
Pressure and Heat Transfer Measurements on Large Indented Nosetips.
Final rept.,
A. M. Morrison, W. C. Ragsdale, and Robert A. Kavetsky. Jun 79, 124p Rept no. NSWC/TR-79-325

This report presents pressure and heat transfer data for 4 indented nosetip shapes. The tests were conducted in the NSWC Hypersonic Tunnel at Mach numbers 5 and 6. The report also presents an instrumentation technique developed as a result of a structural failure of one of the indented nosetip models. (Author)

AD-A088 353/8 PC **A03**/MF **A01**
White Sands Missile Range NM Instrumentation Directorate
On a Third Order Linear Predictor-Corrector Digital Filter.
Final rept.,
Charles K. Chui, and William L. Shepherd. Jul 80, 30p Rept no. STEWS-ID-80-1

A third order linear predictor-corrector digital filter with parameters w1, w2, and w3 is introduced and discussed in this paper. Four particular ones, with different choices of w1, w2, and w3, have been or are being used at White Sands Missile Range (WSMR) of the US Army. In particular, McCool's QD filter and Sheperd's third order parabolic spline filter were devised at WSMR for missile trajectory smoothing, reconstruction, and differentiation. Stability conditions for these filters are derived and discussed. In addition, the filter equations are uncoupled so that design criteria can be obtained. (Author)

SAND-80-1648C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Reentry-Vehicle Flight Testing and Recovery Techniques. Paper AIAA-80-1455.
D. J. Rigali, M. W. Sterk, and J. Randmaa. 1980, 12p CONF-800712-3
Contract AC04-76DP00789
15. AIAA thermophysics conference and 13. AIAA fluid and plasma dynamics conference, Snowmass, CO, USA, 14 Jul 1980.

A technique to soft-recover high ballistic coefficient reentry vehicles from ICBM reentry conditions has been developed and demonstrated. To date, two different types of vehicles have been soft-recovered, utilizing the mass jettison, parachute recovery technique described. The fabrication and assembly of two additional RVs of different designs are presently underway in preparation for flight test. A technique to allow an increase in the severity of the environment from which an RV can be recovered is presently being analyzed and ground-tested with plans to flight-test it within two years. Descriptions of all of these vehicles and a summary of the flight-test results are presented. (ERA citation 05:031025)

16D. Missiles

AD-A088 300/9 PC **A02**/MF **A01**
SRI International Menlo Park CA
Calculation of the Response of Adaption Kits in Accidental Side Impacts.
Bimonthly progress rept. no. 13, 3 May-2 Jul 80,
J. K. Gran, L. E. Schwer, and A. C. Liu. Jul 80, 16p
Contract DAAK10-78-C-0158
See also AD-A080 080.

This report is the thirteenth bimonthly progress report covering SRI International's current study of the response of adaption kits in accidental side impacts. The primary goal of the project is the further development of finite element models for a generic missile structure so that adaption kit response, particularly component accelerations, can be predicted for side impacts of the missile. An additional goal is experimental determination of the impact response of a missile structure that contains a hard link safe-arm device. The work planned for this contract consists of five tasks. In Task 1, we are further developing finite element models for substructures and checking the models' predictions against experimental data. In Task 2, we are using the models to calculate the response of complete structures, again by comparing the predictions with experimental results insofar as feasible. In Task 3, we are transferring the analytical capabilities developed in Tasks 1 and 2 by implementing the SUPER code at AARADCOM. In Task 4, we are performing impact experiments on scale models of a specific prototype missile structure to help plan some full-scale tests. In task 5, we are developing a new bolt element for use in three-dimensional calculations.

N80-29409/3 PC **A05**/MF **A01**
Forschungsinstitut fuer Funk und Mathematik, Werthoven (Germany, F.R.).
Introduction to the Various Laws of Missile Guidance.
K. Becker. Aug 79, 89p FFM-285
Text in German; English Summary.

The success of a missile attacking a target is essentially dependent on the guidance principle adopted. Some typical missile control schemes are discussed and their advantages and disadvantages are shown. Strategies considered are the precomputed course, line of sight guidance, pursuit guidance, constant bearing guidance, proportional navigation, and some modern strategies based on optimal control.

SAND-80-0314 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.

Aeroballistic Analysis of ERB/TIGER II Aerodynamic Test Unit ATU-2 (SLA R715032).
R. W. Greene. Jul 80, 69p
Contract AC04-76DP00789

The results of the first drop test of the 13.3-in-diameter ERB/TIGER II are documented. The test unit, designated Aerodynamic Test Unit-2 (ATU-2), was dropped on August 25, 1977, at the Sandia National Laboratories Tonopah Test Range from an Air Force F-4 Aircraft. Nominal release conditions were an altitude of 20,000 ft mean sea level and Mach 0.8. The purpose of the test was to obtain free-flight vehicle characteristics including the effect of the free-floating rollerons, to evaluate release and separation characteristics of the 13.3-in-diameter vehicle, and to evaluate the performance of the recovery system. Modifications to the mathematical model for the vehicle that yield better agreement between simulation and flight test results are presented. The system is also described. 42 figures, 2 tables. (ERA citation 05:031322)

17.

NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A088 048/4 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Sonar Transducer Reliability Improvement Program (STRIP) FY80.
Quarterly progress rept. no. 3,
Robert W. Timme. 1 Jul 80, 48p Rept no. NRL-MR-4257

Several goals completed during this quarter include: the current phase of research on TCP for use as a transducer fill-fluid; investigation of the strength of shielded and unshielded MIL-C-915/8E cable types; and the first draft of the handbook for connector and cable harness design was partially completed. Progress in other task areas included: CUALT performed on two DT-605 hydrophones which simulated 3 years of life service; and three TR-155F transducers were retrofitted with glass-loaded polyester pressure release mechanisms and passed all acoustic extraneous noise tests.

PB80-855208 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Submarine Detection Equipment. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 66p NERACUSGNT0724
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the development and applications of sonar detection systems used by naval ships, helicopters, and aircraft. Computerized sonar, alternative sonar systems and psychological effects of prolonged exposure to sonar signals are also discussed. (Contains 064 citations.)

17B. Communication

AD-A088 037/7 PC **A03**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
Command and Control Related Computer Technology: Packet Radio.
Quarterly progress rept. no. 17, 1 Dec 78-28 Feb 79,
M. Beeler, R. Perlman, W. W. Plummer, V. Strazisar, and J. Westcott. Feb 80, 27p Rept no. BBN-4337
Contract MDA903-75-C-0180, ARPA Order-2935

This document describes progress on development of a packet radio network. Activities reported include work on Station Software and Internetworking Research and Development. (Author)

AD-A088 038/5 PC **A02**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
Command and Control Related Computer Technology: Packet Radio.
Quarterly progress rept. no. 18, 1 Mar-31 May 79,
M. Beeler. Feb 80, 24p Rept no. BBN-4338
Contract MDA903-75-C-0180, ARPA Order-2935

This document describes progress on development of a packet radio network. Activities reported include work on Station Software and Internetworking Research and Development. (Author)

AD-A088 039/3 PC **A02**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
Command and Control Related Technology: Packet Radio.
Quarterly progress rept. no. 19, 1 Jun-31 Aug 79,
M. Beeler. Feb 80, 21p Rept no. BBN-4339
Contract MDA903-75-C-0180, ARPA Order-2935

This document describes progress on development of a packet radio network. Activities reported include work on Station Software and Internetworking Research and Development. (Author)

AD-A088 100/3 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Voice Communication Research and Evaluation System.
Technical rept.,
Richard L. McKinley. May 80, 17p Rept no. AFAMRL-TR-80-25

Aircraft voice communications may be degraded by a variety of sources such as electrical and/or acoustical noise, radio interference, jamming and various other forms of distraction. The Voice Communication Research and Evaluation System, located in the Biodynamics and Bioengineering Division of the Aerospace Medical Research Laboratory, has been developed for the comprehensive analysis and enhancement of operational voice communication. The basic system is comprised of a multi-station voice communication network consisting of the USAF standard aircraft intercommunication system, a standard A-19 diluter-demand oxygen regulation system and an on line computer data collection and data analysis system that displays results in real time. The system is housed in a large reverberation chamber containing a programmable sound source capable of reproducing the spectrum and level of any AF operational noise environment. Standardized voice communication effectiveness test materials are used to assess the performance of any aspect of the total voice communication link, however, emphasis is usually placed upon the performance of the aircrew members. This paper will descibe the salient features of this unique system and provide examples of its application to voice communication problems. (Author)

AD-A088 110/2 PC **A03**/MF **A01**
Brown Univ Providence RI Div of Applied Mathematics
Averaging Methods for the Asymptotic Analysis of Learning and Adaptive Systems, with Small Adjustment Rate.
Interim rept.,
H. J. Kushner, and Hai Huang. Jun 80, 39p
AFOSR-TR-80-0574
Contract N00014-76-C-0279, Grant AFOSR-76-3092
Sponsored in part by grant NSF-ENG77-12946.

Recently proved theorems concerning weak convergence of non-Markovian processes to diffusions, together with an averaging and a stability method, are applied to two (learning or adaptive) processes of current interest: an automata model for route selection in telephone traffic routing, and an adaptive quantizer for use in transmission of random signals in communication theory. The models are chosen because they are prototypes of a large class to which the methods can be applied. The technique of application of the basic theorems to such processes is developed. Suitably interpolated and normalized 'learning or adaptive' processes converge weakly to a diffusion, as the 'learning or adaptation' rate goes to zero. For small learning rate, the qualitative properties (e.g., asymptotic (large-time) variances and parametric dependence) of the processes can be determined from the properties of the limit. (Author)

AD-A088 149/0 PC **A03**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Radio Receiver Sensitivity (Non-Pulsed).
Final rept. on test operational procedure.
11 Jul 80, 30p Rept no. TOP-6-2-544

This TOP describes the engineering Test Method and Techniques for evaluating the Sensitivity performance of non-pulsed receivers and other devices. The Test Methods provide empirical determinations of Sensitivity, gain and noise limited, 12 dB SINAD, Quieting and Squelch sensitivity. The evaluation is related to criteria expressed in the ROC and MN requirements. These procedures were developed from NBSIR 73-333 modified for receivers up to 400 MHz. (Author)

AD-A088 298/5 PC **A02**/MF **A01**
Rockwell International Thousand Oaks CA Electronics Research Center
A Monolithic GaAs I.F. Amplifier for Integrated Receiver Applications.
D. R. Decker, A. K. Gupta, W. Petersen, and D. R. Ch'en. 1980, 18p
Contract N00014-78-C-0624

A monolithic GaAs integrated amplifier was constructed for the 500 to 1000 MHz intermediate frequency band. The amplifier provides 8.0 + or - 1.5 dB gain across the band. The output of the amplifier utilizes a source follower configuration to obtain a favorably low output VSWR of less than 1.5:1 (return loss >15 dB). All bias lines with integral bypass capacitors are contained on the chip and this amplifier is suitable for further integration as a building block of a monolithically integrated receiver front end.

AD-A088 352/0 PC **A07**/MF **A01**
Raytheon Co Sudbury MA Communications Systems Lab
Digital Group Multiplexers (DGM). Volume 2. Section 3.0, 5.0, 7.0, 15.4.
Final rept. May 75-Feb 80,
William Hatton, Charles Onthank, and Paul Graves. Feb 80, 145p CORADCOM-75-0036-F2
Contract DAAB07-75-C-0036
See also AD-A084 887.

The technical objective of this program was to develop a family of Digital Group Multiplexers (DGM) which form an integral part of the communications Nodal Control Element (CNCE) and the Transmission Facilities associated with the Automatic Central Office Communications, AN/TC-39 (Automatic Switch). The DGM consists of 13 different equipments which 3 are mentioned in this technical document. These are Loop Group Multiplexer (LGM), Remote Loop Group Multiplexer (RLGM), and the Remote Multiplexer Combiner (RMC). The multiplexers and cable transmission equipments will be employed primarily in technical communications control facilities to serve clusters of digital subscribers in a switched network and to provide digital transmission to the Radio Park Via radio or cable. (Author)

AD-A088 364/5 PC **A06**/MF **A01**
ESL Inc Sunnyvale CA
CPSK, DPSK, and FSK Demodulator Performance Under Nuclear Stressed Conditions.
Final rept. 21 Feb 78-31 Mar 79,

Ronald Ibaraki, Randy Heckman, Laurence Kearney, and James Marshall. 31 Mar 79, 109p ESL-TM1083, DNA-5006F, AD-E300 878
Contract DNA001-78-C-0189

The relative performance of satellite communication links using conventional binary CPSK, DPSK, and noncoherent FSK demodulation techniques is evaluated for a range of simulated highly ionized and striation regions which may result following high attitude nuclear detonations. Performance is characterized by bit error rate estimates obtained through extensive computer simulation of satellite downlinks using various modem designs over a range of data rates and fade rates. Phase fluctuations are shown to be an increasingly dominant performance degrading factor as fade rates increase. The interrelated effect on performance of the fade rate, data rate, carrier removal circuit noise bandwidth, and bit energy-to-noise ratio is examined in detail and a number of performance scaling relationships among these parameters is identified which allows the extensive simulated results obtained here to be generalized to similar modems operating at other data rates and fade rates. (Author)

AD-A088 405/6 PC **A03**/MF **A01**
Hydrotronics Inc McLean VA Communications Engineering Div
Validation of Army Spectrum Allocation and Analysis Procedures. Volume I.
Final rept.
1979, 27p
Contract DAAK21-79-C-0011
See also Volume 2, AD-A088 406.

To maintain a viable defensive posture against potential enemies of the United States, and to compensate for probable numerical deficiencies, the U.S. Department of Defense and its components have long pursued a material development pattern of ever increasing sophistication. The associated communications-electronics (C-E) equipments have likewise increased in complexity, sophistication and occupancy of the electromagnetic spectrum. This has occurred simultaneously with an explosion in industrial and consumer communication-electronics technology with its attendant demands on the spectrum resource. The result is that the communications-electronics equipment experimenter, developer or user is confronted with an increasingly difficult task in obtaining spectrum support for emerging systems and equipment. This is particularly critical when the material is mission essential, and failure or delay may be costly or catastrophic in terms of lost time, material resources, tactical advantages, or even lives. (Author)

AD-A088 406/4 MF **A01**
Hydrotronics Inc McLean VA Communications Engineering Div
Validation of Army Spectrum Allocation and Analysis Procedures. Volume II.
Final rept.
1979, 176p
Contract DAAK21-79-C-0011
See also Volume 1, AD-A088 405.
Availability: Microfiche copies only.

This report presents an analysis of details considered under all the Tasks of the Study. The details analyzed and discussed in this Volume were gleaned from visits to various commands and agencies associated with the spectrum allocation to the equipment process, and from literature searches. Commands and Agencies visited by the contractor are listed in Appendix A, hereto. Major documents and References which were reviewed during the course of this Study are listed in Appendix B, hereto. These documents and references were augmented by informal handouts, briefing materials and notes obtained during the visits to the various Commands and Agencies. Statistical data is current as of the scheduled completion date of the respective Task under which it was collected. Data sources were re-visited, however, to determine if major changes or trends has occurred between time of Task completion and the date of this Report. Any significant changes are appropriately noted. (Author)

AD-A088 480/9 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst Troy NY Dept of Electrical and Systems Engineering
Performance Analysis of a Spread Spectrum Receiver Using Transform Domain Filtering.
Technical rept.,
Laurence B. Milstein, and Pankaj K. Das. 1980, 5p MA-ARO-12, ARO-15004.5-EL
Grant DAAG29-77-G-0205
Pub. in Proceedings of AFOSR Workshop in Communication Theory and Applications, EHO-139-6 p92-94 1980.

No abstract available.

NIIAR-26(385) PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Unit for Data Transmission from the A-4096 Analyzer to a Computer.
V. A. Khudyakov, P. N. Glukhov, and A. D. Rabinovich. 1979, 8p
In Russian.
U.S. Sales Only.

Developed is a system for transmission of spectrometric information stored in the memory of the AI-4096 multichannel 18-digit analyzer to the BESM-4-type computer. Transmission is performed using cable line and with the aid of a special unit for data transmission which is placed directly in the analyzer crate and converts information into the kind convenient for transmission. To reduce the number of cables in the line information is transmitted to a computer in a sequential binary code. Data transmission unit transforms the information recieved from the analyzer, from parallel binary code into sequential one. Besides, an additional service information is set in the above unit, which is necessary for data processing and is transmitted to the computer along with the main data. Output signals of the unit provide for a confident accepting of data by the computer at a sufficiently large distance from the analyzer. Test operation of gamma spectrometers on the base of the AI-4096 analyzers in the system of the BESM-4M collective usage has shown a high reliability of the operation of data transmission unit. (Atomindex citation 11:509325)

PB80-226087 CP **T07**
Federal Communications Commission, Washington, DC. Data Automation Div.
Common Carrier Individual Land Mobile Data Base.
Data file,
James McCormick, and Lewis Young, Jr. 11 Sep 80, mag tape FCC/DF-80/017
Supersedes Rept. no. FCC/DF-79/020, PB80-115207.
Source tape is in EBCDIC character set and certain fields contain packed decimal data. Character set restricts preparation in 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions.

The Common Carrier Individual Land Mobile Data Base contains information on all Individual Land Mobile subscribers that are currently licensed. Data base records contains information for: existing licensees; licensees marked for deletion; and transmitter data. The call sign is the major data base identifier.

PB80-226442 CP **T03**
Federal Communications Commission, Washington, DC. Computer Applications Div.
AM Data Base Update Transaction File.
Data file,
Charles Johnson. 12 Sep 80, mag tape FCC/DF-80/018
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

This data file contains transactions for updating the Broadcast Bureau's AM Engineering Data Base. Transaction types contained on the file may consist of additions, modifications to existing records, copies of existing records, or delete transactions. The instruction type field of each data record specifies the nature of the transaction. Additionally, the first record on each tape consists of a batch header. This record provides specific information about the batch number, total adds, total mods, total deletes, total copies, and total transactions. The record is used for control and audit trail purposes (i.e. if the batch number does not match the volume of the data base the update will be aborted).

PB80-226459 CP **T03**
Federal Communications Commission, Washington, DC. Data Automation Div.
FCC Broadcast FM Data Base.
Data file,
Jack Sharkey. 1980, mag tape FCC/DF-80/019
Supersedes Rept. no. FCC/DF-80/015, PB80-111149.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The Broadcast FM Data Base contains records for existing and proposed stations, allocations, rulemaking petitions/proposals, and translator/boosters. The data base is converted from Honeywell system standard format, BCD to EBCDIC, 1600 BPI, 9 track, odd parity tape, on the Honeywell H-6023. The data base contains approximately 10257 records of 300 characters in length, 10 records per block.

PB80-226947 PC **A04**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Service Specification of Transport and Session Protocols.
Draft rept.,
Gregory Pearson, and John Burruss. Mar 80, 73p BBN-4362, NBS-GCR-80-246, ICST/HLNP-80-2
Contract NB79-SBCA-0092

The National Bureau of Standards, Institute for Computer Sciences and Technology (ICST), has initiated a program to develop computer network protocol standards as Federal Information Processing Standards (FIPS). SERVICE SPECIFICATION OF TRANSPORT AND SESSION PROTOCOLS is one of a series of draft reports being prepared under the network protocol standards program for distribution to government agencies, voluntary standards organization, computer and communications equipment manufacturers, and other interested parties. This draft report specifies the actual operation of the proposed transport and session protocols.

PB80-227739 CP **T03**
Federal Communications Commission, Washington, DC. Computer Applications Div.
Broadcast FM Transaction File.
Data file,
Charles Johnson. 1980, mag tape FCC/DF-80/022
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

This data file contains transactions for updating the Broadcast Bureau's FM Engineering Data Base. Transaction types contained in the file may consist of new additions, modifications to existing records, or delete transactions. The instruction type field of each data record specifies the nature of the transaction. Additionaly, each tape consists of a batch header transaction record which provides specific information about the remaining transactions such as batch number and batch date. Its use is for control and audit trail purposes. The batch name field of this record contains the volume number of the data base to be updated.

PB80-227754 CP **T03**
Federal Communications Commission, Washington, DC. Data Automation Div.
Broadcast Applications Address List.
Data file,
Charles Johnson. 1980, mag tape FCC/DF-80/020
Supersedes Rept. no. FCC/DF-79/014, PB80-108731.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track re-

cording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The Broadcast Applications Processing (BAPS) Address Label Data is to be run against the BAPS Address Label List Program to produce a listing (address) of all the AM, FM, and TV licensees in the BAPS Base.

PB80-227762 CP **T03**
Federal Communications Commission, Washington, DC. Computer Applications Div.
TV Data Base Update Transaction File.
Data file,
Charles Johnson. 12 Sep 80, mag tape FCC/DF-80/021
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

This data file contains transactions for updating the Broadcast Bureau's TV Engineering Data Base. Transaction types contained on the file may consist of additions, modifications to existing records; transfer of existing records, or delete transactions. The instruction type field of each data record specified the nature of the transaction. Additionally, the first record on each tape consists of a batch header. This record provides specific information about the batch number, total adds, total mods, total deletes, total transfers, total transactions, and the check all records key. The record is used for control and audit trail purposes (i.e., if the batch number does not match the volume of the data base the update will be aborted.)

PB80-227770 CP **T99**
Federal Communications Commission, Washington, DC. Data Automation Div.
FCC Frequency Master File.
Data file,
M. P. Rinn. Jan 80, mag tape FCC/DF-80/003
Supersedes Rept. no. FCC/DF-79/012, PB-297 341.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price.

The FCC Frequency Data Base contains records reflecting type of service, call sign, station and license identification, location radio frequency, mailing address (all items do not contain complete mailing address'), issue and expiration dates, and various other codes and data elements. The data base is maintained on disk in standard Honeywell ISP format and is copied to tape in Honeywell system standard format, 1600 BPI, 9-Track, Odd Party, using the standard Honeywell BCD character set. The data base contains data for the following radio services: Aviation land; Broadcast auxiliary; Broadcast; Common carrier (Fixed public); Common carrier (Land mobile); Experimental; Industrial (Business); Industrial (Special); Industrial (Other); Land transportation; Marine (Alaska); Marine (Other); Public safety (Police); Public safety (Other); and General.

PB80-850548 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Multiplexing in Aircraft. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 89p
NERACIAANT0318
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles discuss the use, design, and application of multiplexing for military, commercial and supersonic aircraft. (Contains 102 citations.)

PB80-850555 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Multiplexing in Aircraft. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 89p
NERACUSGNT0318
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles discuss the use, design, and application of multiplexing for military, commercial and supersonic aircraft. (Contains 069 citations.)

PB80-851041 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electronic Mail. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 46p
NERACUSGNT0442
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss design and application of scanner technology used in electronic mail systems. Also mentioned are satellite frequency requirements for the U.S. Postal Service and conversion systems for the electronic mail handling programs. (Contains 082 citations.)

PB80-851066 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Facsimile Communication. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Aug 80, 95p
NERACIAANT0231
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the application of facsimile communication in Public Switched Networks (PPSNS), telephone networks, and other global communication systems. A discussion of manufacture, the design of facsimile communication equipment is also included. (Contains 108 citations.)

PB80-851074 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Facsimile Communication. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Aug 80, 140p
NERACUSGNT0231
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the application of facsimile communication in Public Switched Networks (PPSNS), telephone networks, and other global communication systems. A discussion of manufacture, the design of facsimile communication equipment is also included. (Contains 125 citations.)

PB80-851082 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Facsimile Communication. June, 1973-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 73-Jun 80,
Howard L. Ogushwitz. Aug 80, 179p NERACEI NT0231
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the application of facsimile communication in Public Switched Networks (PPSNS), telephone networks, and other global communication systems. A discussion of manufacture, the design of facsimile communication equipment is also included. (Contains 200 citations.)

PB80-852387 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Infrared Communications. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 162p
NERACIAANT0683
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the use of infrared light waves in communication. A description of the design and implementation of devices using laser and thermal imaging for this purpose is also included. (Contains 150 citations.)

PB80-852395 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Infrared Communications. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 73p NERACEI NT0683
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the use of infrared light waves in communication. A description of the design and implementation of devices using laser and thermal imaging for this purpose is also included. (Contains 064 citations.)

PB80-853617 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Communication Satellites. April, 1978-June, 1980 (Citations from the NTIS Data Base).
Rept. for Apr 78-Jun 80,
Walter Van Put. Jun 80, 225p
NERACUSGNT0583
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the technology, design, reliability, and performance of communication satellites. Citations include descriptions of high and low capacity satellites, their antennae, receivers, radar, and amplifiers, and also digital systems, television broadcasting, and earth stations. (Contains 197 citations.)

PB80-853625 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Communication Satellites. July, 1978-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jul 78-Jun 80,
Walter Van Put. Jun 80, 187p NERACEI NT0583
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the technology, design, reliability, and performance of communication satellites. Citations include descriptions of high and low capacity satellites, their antennae, receivers, radar, and amplifiers, and also digital systems, television broadcasting, and earth stations. (Contains 195 citations.)

PB80-856636 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Delta Modulation. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jul 80, 124p
NERACIAANT0251
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the theory and application of Delta modulation. Techniques for data compression, correction of transmission errors, bandwidth analysis and design of associated equipment are presented. (Contains 128 citations.)

PB80-856644 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Delta Modulation. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jul 80, 89p
NERACUSGNT0251
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the theory and application of Delta modulation. Techniques for data compression, correction of transmission errors, bandwidth analysis and design of associated equipment are presented. (Contains 080 citations.)

PB80-856651 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Delta Modulation. September, 1971-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Sep 71-Jun 80,
Howard L. Ogushwitz. Jul 80, 177p NERACEI NT0251
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the theory and application of Delta modulation. Techniques for data compression, correction of transmission errors, bandwidth analysis and design of associated equipment are presented. (Contains 200 citations.)

PB80-856669 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pulse Modulation. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jul 80, 147p NERACIAANT0245
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations contain abstracts discussing pulse modulation/encoding schemes, pulse code modulation, digital phase modulation, pulse frequency modulation, pulse duration modulation, and other forms of pulse modulation. (Contains 154 citations.)

PB80-856677 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pulse Modulation. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jul 80, 66p NERACUSGNT0245
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations contain abstracts discussing pulse modulation/encoding schemes, pulse code modulation, digital phase modulation, pulse frequency modulation, pulse duration modulation, and other forms of pulse modulation. (Contains 057 citations.)

PB80-856685 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pulse Modulation. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jul 80, 130p NERACEI NT0245
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations contain abstracts discussing pulse modulation/encoding schemes, pulse code modulation, digital phase modulation, pulse frequency modulation, pulse duration modulation, and other forms of pulse modulation. (Contains 130 citations.)

PB80-856891 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Satellite Receivers. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 106p NERACIAANT0264
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss ground tracking and data acquisition receivers for satellites. Also included is a discussion of the design and testing of various types of receivers. (Contains 150 citations.)

PB80-856909 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Satellite Receivers. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 62p NERACUSGNT0264
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss ground tracking and data acquisition receivers for satellites. Also included is a discussion of the design and testing of various types of receivers. (Contains 048 citations.)

PB80-856917 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Satellite Receivers. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 35p NERACEI NT0264
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss ground tracking and data acquisition receivers for satellites. Also included is a discussion of the design and testing of various types of receivers. (Contains 027 citations.)

PB80-858244 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Mobile Communication Systems. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 30p NERACEI NT0434
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography describe the design and application of various mobile communication systems. Among the systems discussed are satellited communication systems for mobile terminals, maritime mobile telephone switching system and digital selective calling system for maritime mobile service. (Contains 025 citations.)

PB80-859507 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Communication Satellites. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jun 80, 167p NERACIAANT0583
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the technology, design, reliability and performance of communication satellites. Citations include descriptions of high and low capacity satellites, their antennae, receivers, radar, and amplifiers; and also digital systems, television broadcasting, and earth stations. (Contains 147 citations.)

PB80-859903 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Infrared Communications. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 222p NERACUSGNT0683
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the use of infrared light waves in communication. A description of the design and implementation of devices using laser and thermal imaging for this purpose is also included. (Contains 192 citations.)

17C. Direction Finding

AD-A088 093/0 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Bearing-Only Tracking Algorithms.
Final rept.,
Alex Grindlay. 16 Jul 80, 18p Rept no. NRL-8421

The problem of tracking emitters, via asynchronous bearing measurements made at two remote sites, was addressed. Three algorithms were developed for this purpose; a statistical moving average technique, a modified Kalman filter technique, and an extended Kalman filter technique. The performances of the algorithms in several selected scenarios were compared, with the preliminary results indicating that the modified Kalman filter technique is superior in its ability to rapidly develop a reasonable track. The extended Kalman filter technique demonstrated superior tracking performance once it had settled down; however, for the cases considered this required an unreasonable amount of time. Further investigation is required to assess the performance of the algorithms against maneuvering targets. The effect of varying the time between measurements should also be considered. (Author)

17E. Infrared and Ultraviolet Detection

AD-A087 981/7 MF **A01**
Teledyne Brown Engineering Huntsville AL Systems Div
Organization and Manipulation of Infrared Scene Data and Infrared Modeling.
Final rept.,
John Rainey, and Rhett Burton. Nov 79, 133p
Rept no. SD79-MICOM-2387
Contract DAAK40-79-C-0068
Availability: Microfiche copies only.

This report documents the work performed by Teledyne Brown Engineering in the organization, classification, and manipulation of infrared scene data for the U.S. Army Missile Command (MICOM) Advanced Sensors Directorate. Software was developed for a PDP 11 computer with an on-line GRINNELL television imaging system to aid in classifying infrared scenes and extracting targets from such scenes. The storage and retrieval of the scene classifications was automated by the development of a data base and data base manager. The manipulation of the data included the calculation of power spectral densities and autocorrelation functions, the cross-correlation of targets with selected classes of background scenes, the application of a whitening filter based on the power spectral density of the background class, and the cross-correlation of two sensor FOV (field of view) models with the target scenes and background scenes. (Author)

AD-A088 007/0 PC **A06**/MF **A01**
General Dynamics Pomona CA Pomona Div
Background Spectral Radiance and Contrast in the Near-UV, Mid-IR, and LWIR Regions,
G. W. Ashley, D. W. Blay, E. O. Buenting, L. Gastineau, and G. C. Halterman. Oct 76, 118p
Rept no. TM6-125PH-438
A Compilation of General Dynamics Measurement Data.

Absolute spectral radiance signatures of a number of natural backgrounds have been measured in the following wavelength regions: Near - UV (0.30 - 0.44 micron), MID - IR (1.5 - 5.4 and 2.0 - 5.4 micron), LWIR (2 - 13 micron). The infrared data were obtained using an interferometer with high spectral and spatial resolution while the near-UV data were acquired using a dispersive-prism spectrometer. In addition to the individual background spectra, spectral contrast plots are presented for spatially adjacent background areas. These contrast plots can be used in conjunction with target spectra to derive optimized spectral regions of operation for target detection systems. Also included are photographs illustrating the spatial appearance of the various background areas in appropriate wavelength bands. (Author)

AD-A088 241/5 PC **A05**/MF **A01**
Optimetrics Inc Ann Arbor MI
Reduction and Assessment of Infrared Background Data.
Memorandum rept.,
Scott M. Singer, Frederick G. Smith, Timothy J. Rogne, and Richard A. Steinberg. 7 Aug 80, 76p OMI-80-002, NRL-MR-4284, NRL/EOTPO-62
Contract N00173-79-C-0461

The outstanding problem in designing passive infrared detection sensors is the design of effective target/background discrimination algorithms. A key factor in the design process is the requirement for a data base of high spatial resolution, low noise, background imagery. The cloud and ocean sunglitter data discussed in this report, obtained by Cincinnati Electronics Co. (CECO), are intended to help satisfy this requirement for infrared (IR) background imagery. We recommend that future IR backgrounds measurements with the CECO radiometer incorporate the following suggestions: the CECO radiometer should be upgraded to incorporate DC restoration; data should be recorded from all 24 detector channels, rather than just 8 channels; tape recorder noise should be decreased by improving the data recording system. (Author)

AD-A088 270/4 PC **A03**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Electro-Optical Tests of CCD Imagers at the GEODSS ETS.
Technical rept.,
Daniel F. Kostishack, Carl H. Gylfphe, Jr., Malcolm J. MacDonald, and Norman G. S. Pong. 20 Feb 80, 36p TR-539, ESD-TR-79-326
Contract F19628-80-C-0002

As part of the GEODSS-CCD Technology Program, a series of three electro-optical tests of CCD imagers was conducted on the GEODSS Experimental Test System (ETS) at Socorro, New Mexico. The tests were preliminary to establish the basis for developing and testing an advanced CCD automatic detection system which would provide improved sensitivity and scan coverage rate for GEODSS applications. These preliminary tests resulted in the successful demonstration of STARE and image-motion-compensation (IMC) modes of operation, and provided a thorough evaluation and verification of present CCD system design models. Also, interesting electro-optical performance levels were demonstrated, compared with existing GEODSS system designs. (Author)

AD-A088 438/7 PC **A02**/MF **A01**
Tennessee Univ Space Inst Tullahoma Gasdynamics Div
Photographic Spectroscopic Measurement of Ultraviolet Solid Rocket Motor Plumes.
Final rept.,
Dennis R. Keefer, William J. Phillips, and Kenneth E. Harwell. 7 Feb 80, 17p Rept no. UTSI-GD-TR-80-1
Contract N60530-78-C-0020

Photographic spectra having a nominal bandpass of 0.4nm were obtained from the radiation from several solid rocket motor exhausts in the spectral region 250nm to 430 nm. The spectra consisted primarily of a continuum with some molecular band structure which was found to originate from the molecules OH, PbO, NO & CHO. These molecular bands were more pronounced in the region 290 nm to 320 nm, but the radiating systems involved extend to shorter wavelengths. The source of the continuum radiation was not determined explicitly, but is not inconsistent with a CO + O recombinations mechanism. (Author)

17G. Navigation and Guidance

AD-A087 947/8 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (Afcs) Scott AFB IL
TRACALS Evaluation Report AN/GRN-29 SSILS Initial Evaluation Report, Kelly AFB, Texas, 20 September - 11 October 1979 and 17-21 March 1980.
Final rept.,
Joseph R. Coyle, and David E. Thibodeau. 20 Jun 80, 99p Rept no. 79/66N-189

This report presents the results of the 20 Sep - 11 Oct 1979 and 17-21 March 1980 TRACALS Evaluation of the Kelly AN/GRN-29 SSILS and associated power systems. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening or operational use. (Author)

AD-A087 962/7 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (Afcs) Scott AFB IL
TRACALS Evaluation Report. Communications Initial Evaluation Report, Hurlburt Fld, Florida, 8-15 April 1980.
Final rept.,
Robert S. Antonio, and Robert Romanski. 20 Jun 80, 95p Rept no. 80/66C-210

A Communications Initial Evaluation was performed at Hurlburt Fld, Florida from 8-15 April 1980. The purpose of the evaluation was to define the capabilities and limitations of the ATC communications system. Included in this report are the results and analysis of ground equipment and system measurements, and correlation of predicted and measured receive signal levels as they affect horizontal and vertical coverage. This report can be used as a guide for anticipated performance of the ATC communications system until there is a deletion, addition, relocation of equipment, or a change in the horizon profile. (Author)

AD-A088 001/3 PC **A15**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
MLS Multipath Studies. Phase 3. Volume II. Development and Valiadation of Model for MLS Techniques.
Final rept.,
J. E. Evans, S. J. Dolinar, D. A. Shnidman, and R. C. Burchsted. 7 Feb 80, 332p ATC-88-Vol-2, FAA-RD-79-21-VOL-2
Contracts F19628-80-C-0002, DOT-FA74-WAI-461
See also Volume 1, AD-A087 827.

This report presents work done during phase 3 of the US national Microwave Landing System (MLS) program toward the developing of a computer simulation mode of MLS multipath effects, the experimental validation of the model, and the application of the model to investigate multipath performance of ICAO proposals for the new approach and landing guidance system. The second volume of the report presents the mathematical models and validation data for the MLS techniques which were assessed in detail by the All weather Operations Panel of the International Civil Aviation Organiation. The specific technques modeled are: 1. The Time Reference Scanning Beam (TRSB) sysem proposed by the United States (US) and Australia, with prime emphasis on the US equipment implementation and field test data, 2. the Doppler scan (DMLS) proposed by the United Kingdom, 3. the DME Based Landing System (DLS) proposed by the Federal Republic of Germany. (Author)

AD-A088 024/5 PC **A03**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
Northeast Corridor User Evaluation.
Interim rept. Jul-Nov 79,
Joseph Harrigan. Apr 80, 48p FAA-NA-80-13, FAA-RD-80-17

This report describes an evaluation of the Northeast Helicopter Corridor Routes (NEC). The Northeast Corridor is an experimental route between Boston and Washington, D.C., consisting of two, one-way, reduced width airways designed expressly for helicopter operations. The evaluation is a joint effort of the Federal Aviation Administration (FAA) and the Helicopter Association of America (HAA). The data being gathered is in the form of data extraction tapes from Automated Radar Terminal Service (ARTS) equipped air traffic control (ATC) facilities along the routes and flight logs submitted by the helicopter pilots after each corridor test flight. The test flights are being made as cooperating corporate helicopter operators fly the corridor in the course of their normal operations. The data collection phase of this evaluation began July 15, 1979, and will continue until July 15, 1980. (Author)

AD-A088 070/8 PC **A09**/MF **A01**
Rosenberg (Paul) Associates Pelham NY
Position-Location/Navigation Systems Overview for Military Land Vehicles.
Final technical rept. 3 Aug 78-29 Jun 79,
Paul Rosenberg. 29 Jun 79, 191p TARADCOM-TR-12496
Contract DAAK30-78-C-0091

Position-location/navigation systems are overviewed tutorially for possible application to military land vehicles. The overview includes position-location by celestial navigation, rho/theta systems, hyperbolic systems, radar, inertial systems and satellite systems. Potential advantages and disadvantages of applying various position-location systems to military land vehicles are suggested. (Author)

AD-A088 092/2 PC **A03**/MF **A01**
Naval Research Lab Washington DC
CPS NAVSTAR-4 and NTS-2 Long Term Frequency Stability and Time Transfer Analysis.
Interim rept.,
J. A. Buisson, T. B. McCaskill, O. J. Oaks, M. M. Largay, and S. B. Stebbins. 30 Jun 80, 32p Rept no. NRL-8419

Since the launch of the first Navigation Technology Satellite (NTS) in 1974, international time-transfer experiments have been performed as part of the concept validation phase of the Global Positioning System (GPS). Time-transfer results from both NTS-1 and NTS-2 are presented, including recent measurements from receivers located in South America, Germany, Japan, and the United States. A time link to the DOD Master clock allows submicrosecond intercomparison of UTS (USNO, MC1) with clocks in the respective countries via the NTS link. Work is progressing toward a retrofit conversion of existing NTS receivers (located at NASA and foreign observatories) into GPS time-transfer receivers. Initial results are presented on the long-term rubidium frequency stability as measured from the GPS NAVSTAR-4 space vehicle (SV). Analysis has been performed for sample times varying from 1 to 10 days. Using a 154-day data span starting on day 36, 1979, data was collected from the four GPS monitor stations located at Vandenberg, Guam, Alaska, and Hawaii. A time domain estimate for the NAVSTAR-4 SV clock offset is obtained for each SV pass over the GPS monitor sites, using a smoothed reference ephemeris, with corrections for ionospheric delay, tropospheric delay, earth rotation, and relativistic effects. Conversion from the time domain to the frequency domain is made using the two-sample Allan Variance; sigma-tau plots are used to identify the noise processes. Estimates of flicker and white frequency noise for the NAVSTAR-4 rubidium frequency standard are obtained.

AD-A088 153/2 PC **A07**/MF **A01**
National Telecommunications and Information Administration Boulder CO Inst for Telecommunication Sciences
An Atlas of Basic Transmission Loss for 0.125 to 15.5 GHz,
M. E. Johnson, and G. D. Gierhart. Aug 80, 133p FAA-RD-80-1
Contract DOT-FA77WAI-742

This report provides an atlas of air/ground and air/air basic transmission loss predictions made with the IF-77 (ITS-FAA-1977) propagation model. Sets of predictions are provided for each of six frequencies; i.e., 0.125, 0.3, 1.2, 5.1, 9.4, and 15.5 GHz. Each set contains curves for 90 antenna height combinations where one antenna height varies from 3 to 30,000 m, and the other varies from 300 to 30,000 m. Each height combination is repeated for three time availabilities: 0.05, 0.5, and 0.95. Hence, 1620 transmission loss versus distance curves are provided. The maximum distance used in 1800 km. Propagation factors and application considerations are discussed. Example problems are used to illustrate the various application methods provided. (Author)

AD-A088 204/3 PC **A02**/MF **A01**
Federal Aviation Administration Technical Center Atlantic City NJ
Initial Data Bank Report (Fall 1978; Winter/Spring/Summer/Fall 1979; Winter 1980).
Data rept. 1978-1980,

Lorraine I. Rzonca. Jul 80, 22p FAA-CT-80-189, FAA-RD-80-83

The International Bank for airborne-Omega data has begun operation at the Federal Aviation Administration (FAA) Technical Center. This first report issued by the Data Bank is based upon preliminary data for Pacific flights in fall 1978 and winter/spring 1979 and upon data from North Atlantic flights in summer/fall 1979 and winter 1980. At least three Omega stations were received during all phases of these flights. No significant seasonal variations or effects due to solar activity were noted in the signal-to-noise values. These values were highly repeatable (under the same conditions) with major drops due to ice cap attenuation and operation in areas of normally high very low frequency (VLF) noise. Differences in signal-to-noise between signals traversing daylight/night ice cap (for both Greenland and Antarctica) were noted. (Author)

AD-A088 263/9 PC **A05**/MF **A01**
Naval Surface Weapons Center Dahlgren Lab VA
NSWC SATRACK Multiple Satellite Processor (SAMSAP).
Technical rept.,
J. Edwin Johnson. Mar 78, 86p NSWC/DL-TR-3939, GIDEP-E162-0420

This report relates to performance evaluation of fleet ballistic missile systems, using the satellites of the Global Positioning System for error analysis. The SAMSAP computer program combines the pass normal matrices for the individual satellites into one system of simultaneous equations. The normal equations may be expanded to include the parameters of the station and satellite clock, gravity, and polar motion. The equations are solved for the parameter corrections and the systems covariance matrix at epoch. The corrected system state vector and the system covariance matrix are then propagated through the trajectory fit span and output to a tracked ephemeris data tape that is used by Johns Hopkins University in their Post-Flight Processor. (Author)

AD-A088 266/2 PC **A12**/MF **A01**
Transportation Systems Center Cambridge MA
Loran-Based Buoy Position Auditing Systems. Analytical Evaluation.
Final rept. Feb-Dec 79,
Joseph A. Wolfson, Peter D. Engels, Martin C. Poppe, Jr., James M. Foltz, and Leon M. DePalma. Feb 80, 256p TSC-USCG-80-2, USCG-D-09-80

An analytic evaluation and comparison of the following candidate Buoy Position Auditing System (BPAS) configurations is presented in this report: transmission of digital Time Difference (TD) data from a Loran-C receiver on the buoy, retransmission of Loran-C pulses from the buoy, and combination of helicopter Loran-C data and helicopter-to-buoy microwave ranging data in a variable geometry solution. The candidate BPAS configurations utilize Loran-C in the differential mode. A model is developed to characterize differential Loran-C errors, accounting for the expected effect of the land/sea water conductivity interface. The error model is utilized alone, or with a microwave ranging system error model, to estimate buoy position-fix accuracy afforded by each BPAS configuration. Accuracy estimates and data on cost, complexity, and technical risk are employed to recommend a BPAS configuration for testing. It is concluded that Loran-C pulse retransmission is not a viable BPAS configuration. The variable geometry BPAS configuration is highly accurate, due to calibration of Loran-C errors by processing of redundant data, but is not presently cost-effective. The digital TD transmission BPAS configuration is recommended for testing, due to its simplicity and low cost.

AD-A088 345/4 PC **A07**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Alternate Waveforms for a Low-Cost Civil Global Positioning System Receiver.
Final rept. Aug 79-Apr 80,
Herman F. Vandevenne, and Edward J. Kelly. Jun 80, 128p ATC-86, FAA-EM-79-16, TSC-FAA-79-24
Contract DOT/TSC-RA-78-06

This report examines the technical feasibility of alternate waveforms to perform the GPS functions and to result in less complex receivers than is possible with the GPS C/A waveform. The approach taken to accomplish this objective is (a) to identify, after a quick broad overview, a few promising waveforms, (b) to complete the architectural synthesis of a GPS system based on the new waveforms, (c) to analyze the performance of these systems in providing ranging and communication capability and (d) to assess the impact on receiver hardware and software. One conclusion is that the class of pulsed waveform, when combined with emerging matched filter technology, permits the use of a greatly simplified receiver design. A major part of the report consists of description of a pulse-based GPS design. Although very specific, the design was intended as a vehicle for performance analysis only and many refinements and alternatives within the same class are possible. Other classes of waveforms such as tone ranging and chirped FM waveforms, although adequate, do not seem superior to the present PN encoded CW waveform for GPS. Finally, if the 'alternate' waveform is simply the present C/A waveform but with a substantially increased power level, it is shown that with the present designs the performance will be greatly increased or, alternatively, performance margin can be traded for a simplified receiver implementation. (Author)

AD-A088 426/2 PC **A09**/MF **A01**
Systems Control Inc (Vt) Palo Alto CA
Airborne Radar Approach Flight Test Evaluating Various Track Orientation Techniques.
Final rept.,
Larry D. King. Jun 80, 194p FAA-RD-80-60
Contract DOT-FA79WA-4293

This comprehensive report presents the results of a flight test experiment of an Airborne Radar Approach (ARA) System utilizing various track orientation techniques and operational modes. The tests were performed in the immediate area of NAFEC in Atlantic City, N.J. The test environment involved the airport terminal area and offshore sites. The test aircraft was a NASA CH53A helicopter manufactured by Sikorsky Aircraft and currently based at NAFEC. The test period was from January 1979 to February 1979 and from June 1979 to August 1979. Flight tests for ARA accuracy and procedures development were performed in six distinct operational modes. These were as follows: beacon w/cursor, multiple beacon, skin paint, skin paint w/cursor, combined and beacon-only modes. The specific program objectives can be summarized as follows: (1) to evaluate the ability of the radar operator to guide an aircraft along a predetermined path using various track orientation techniques, namely: the cursor and multiple beacon techniques; (2) to assist the FAA in developing and certifying standard ARA procedures and weather minimums; (3) to define and quantify specific ARA system functions and characteristics for use in a Minimum Operational Performance Standards (MOPS) document.

PATENT-4 192 245 Not available NTIS
Department of the Navy Washington DC
Guiding Means for Self-Propelled Torpedoes.
Patent,
Paul M. Kendig, James M. Lawther, and Robert G. James. Filed 14 May 58, patented 11 Mar 80, 14p AD-D007 422/9, PAT-APPL-735 915
Supersedes PAT-APPL-735 915-58.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention is based on the principle that certain characteristics of the wake of a moving vessel effect the motional impedance of an electroacoustic transducer to produce a fluctuation of impedance about one percent of the average value of transducer impedance in clear water. Theoretical and experimental studies made in the development of this invention indicated that the bubble content of the wake of a moving vessel is sufficient to produce a reduction in the specific acoustic resistance of the medium which appreciably changes the electrical impedance of a resonant electroacoustic transducer and/or that the very near approach or actual contact of one or more bubbles with the face of an electroacoustic transducer has substantially the same effect on its motional impedance circle and may be used as the actuating agent in a torpedo-borne wake-sensing and control system up to speeds at least as high as 45 knots.

PATENT-4 209 767 Not available NTIS
Department of the Navy Washington DC
Acousto-Optic Coupler for Glide Slope Control Systems.
Patent,
David R. Flanders. Filed 3 Mar 77, patented 24 Jun 80, 5p AD-D007 432/8, PAT-APPL-773 883
Supersedes PAT-APPL-773 883-77, AD-D004 505.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention is an acousto-optic coupler for enhancing safety and control of glide slope direction between approaching aircraft and carrier landing facilities. Aircraft engine noise is mechanically coupled through the airframe to modulate light beam signals generated by an aircraft landing light. An optical receiver on board the carrier receives the modulated light beam which is detected, filtered and amplified to produce an output signal from an acoustic transducer. The acoustic output signal is monitored by landing personnel for changes in engine noise responsive to carrier originated commands for glide slope control.

PB80-850910 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
NAVSTAR Global Positioning Systems. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 124p
NERACIAANT0230
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles cover topics on NAVSTAR Satellites. Discussion of NAVSTAR global positioning, and navigation are included. (Contains 114 citations.)

PB80-850928 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
NAVSTAR Global Positioning Systems. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 56p
NERACUSGNT0230
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles cover topics on NAVSTAR Satellites. Discussion of NAVSTAR global positioning, and navigation are included. (Contains 045 citations.)

17H. Optical Detection

AD-A088 098/9 PC **A05**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Simulation Study on Detection and Estimation of Closely Spaced Optical Targets.
Technical note,
Ming-Jer Tsai. 18 Mar 80, 79p TN-1980-19, ESD-TR-80-23
Contract F19628-80-C-0002

The observed signal which originates from two point targets may exhibit only one apparent peak when they are located within one detector width. The Akaike information criterion and a maximum likelihood estimator are used to detect and estimate such unresolved targets. For target separation between 3/4 and 1 detector width the detection rate is high, the estimator is unbiased and the estimation variance is close to the Cramer-Rao bound. The performance degrades greatly when the separation becomes smaller. This loss in performance is attributed to the increasingly interference between the two targets and the difficulty in providing a 'good' initial guess for the estimator.

17I. Radar Detection

AD-A088 085/6 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Present and Future Trends in Signal Processing Technologies.
Memorandum rept.,
Peter N. Marinos. 11 Aug 80, 32p Rept no. NRL-MR-4299

This report provides a quick overview of various signal processing technologies and evaluates their impact on modern radar design in the 1980's. Although primary emphasis is placed on conventional solid-state technologies, a serious effort has been made to review more exotic physical phenomena and related technologies which have attracted, recently, a great deal of interest and are no longer viewed as scientific curiosities. The later group includes surface acoustic waves (SAW), charge-coupled devices (CCD), magnetic bubble memories (MBM), Josephson junction (JJ) devices, and acousto-optics.

AD-A088 163/1 PC **A04**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
An Analysis of Foliage Effects on Long-Range Surveillance.
Technical note,
Donna L. Hogan. 23 Apr 80, 55p TN-1980-9, ESD-TR-80-29
Contract F19628-80-C-0002

Visibility is one of the key factors in determining the outcome of battles. With the advent of long-range, moving target, air-to-ground surveillance radars, the motion of both the observing platform and the target have added to the visibility problem, which heretofore was analyzed in terms of shielding. The interaction of such factors as the minimum detectable velocity of the target, the trajectories of the target and the airborne radar platform, and the terrain and foliage masking combine to control the amount of time which a target is observed in a given scenario. This report continues the work done on dynamic masking, compares the masking calculation with and without foliage on a typical super highway in New England, and finally examines the correlation between predicted and observed foliage and terrain masking. The work was done in connection with the test and evaluation of the Multiple Antenna Surveillance Radar (MASR), a scaled model of a long-range moving target surveillance system. MASR operated at L-band with a beamwidth of approximately 4.5 deg. In typical flight operation it observed the target complex from a range of 25 to 40 km. The altitude was selected to give lookdown angles ranging from 3 deg to 6 deg.

AD-A088 195/3 PC **A02**/MF **A01**
M and S Computing Inc Huntsville AL
Information Analysis of Dynamical Radar Parameters.
Technical rept.,
H. Vincent Poor. 1 Apr 80, 23p 80-036, DRSMI-RE-CR-80-12
Contract DAAK40-79-D-0018

This report examines the extension of the classical information analysis of radar systems to more general situations arising in modern radar practice. In particular, the introduction of dynamics into parameter modeling is considered in an information theoretical context. Such a treatment is motivated by the need to consider parameter dynamics in discrimination-mode radar signal processor design. Expected applications of the proposed techniques include development of theoretical performance limitations which can be used as benchmarks to which the performance of practical systems can be compared.

AD-A088 202/7 PC **A02**/MF **A01**
Rome Air Development Center Griffiss AFB NY
A Parabolic Cylinder Reflector System with Low Sidelobes - Experimental Results.
Final rept.,
Peter R. Franchi, Nicholas P. Kernweis, and Lancer F. Dennett. Nov 79, 21p Rept no. RADC-TR-79-312

An off-set parabolic cylinder reflector system with low sidelobes is described, and experimental results are presented to substantiate the theoretical design. A reduced height waveguide primary feed system superimposing the TE(10) and TE(30) waveguide modes was designed, fabricated, and tested so that the required bandwidth and far field radiation patterns could be realized. (Author)

AD-A088 235/7 PC **A02**/MF **A01**
Varian Associates Inc Palo Alto CA
Advanced AN/TPQ-37 Transmitter Tube.
Interim rept. Oct 78-Jun 79,
R. H. Giebeler. Aug 80, 16p DELET-TR-78-3007-1
Contract DAAB07-78-C-3007

The purpose of this program is to improve the performance and reliability of the AN/TPQ-37 transmitter tube. The task is to build and test two high power, PPM focused, grid pulsed Traveling Wave Tube (TWT) that meet the requirements of Technical Guidelines MW-119B. The TWT will employ a M-type cathode for reduced temperature operation and extended life. Gain variations will be minimized by use of in-band loss techniques and weight will be reduced by using samarium cobalt magnets. (Author)

AD-A088 320/7 PC **A21**/MF **A01**
SRI International Menlo Park CA
Operation of the PAVE PAWS Radar System at Beale Air Force Base, California. Part 1. Basic EIS & Appendices.
Final environmental impact statement.
Jul 80, 486p AFSC-TR-80-09
Contract F08635-76-D-0132
See also Part 2, AD-A088 321.

The document is the Final Environmental Impact Statement on the operation of the Pave Paws Radar System at Beale Air Force Base California. (Author)

AD-A088 321/5 MF **A01**
SRI International Menlo Park CA
Operation of the PAVE PAWS Radar System at Beale Air Force Base, California. Part 2. Public Comment & AF Response.
Final environmental impact statement.
Jul 80, 192p AFSC-TR-80-10
Contract F08635-76-D-0132
See also Part 1, AD-A088 320.
Availability: Microfiche copies only.

This document presents the public comment and Air Force response to the Final Environmental Impact Statement on the Operation of the Pave Paws Radar System at Beale Air Force Base California. (Author)

AD-A088 323/1 PC **A03**/MF **A01**
National Research Council Washington DC Engineering Panel on the PAVE PAWS Radar System
Radiation Intensity of the PAVE PAWS Radar System.
Technical rept.
1979, 50p AFSC-TR-80-12
Contract F49620-78-C-0118

In May 1978, when the U.S. Air Force requested the National Research Council to assess certain aspects of its newest missile defense warning system then under construction at the Otis Air Force Base on Cape Cod, Massachusetts, the facility was the subject of intense public concern that exposure to its radiation emissions might be harmful to humans. The purpose of the radar facility, known as PAVE PAWS (PAVE being a code word for the Air Force unit in charge of the project PAWS and acronym for Phased Array Warning System) is to detect and track ballistic missiles launched at sea as far as 3,000 nautical miles from U.S. shores. In order to discern ballistic missiles early in their trajecotry, it operates at an angle as low as 3 degrees above the horizon. Its long range capacity is achieved by a fairly high average power level of 145kW. The Research Council's initial response was to establish two separate panels to examine the facility--one, the Engineering Panel on the PAVE PAWS Radar System, under the Assembly of Engineering, and the other the Panel on the Extent of Radiation from the PAVE PAWS Radar System Assembly of Life Sciences. this is the report of the engineering panel. The report of the second panel, consisting of an analysis of the exposure levels and potential biological effects of PAVE PAWS, will be published separately.

AD-A088 376/9 PC **A03**/MF **A01**
Calspan Advanced Technology Center Buffalo NY
Derivation of Narrowband Frequency-Agile Radar Signatures from Wideband Data (Analysis of X-Band Data).
Final rept. 7 Sep 76-7 Mar 79,
B. H. Mohlke, R. A. Padgug, C. M. Szczesny, and P. M. McMahon. 2 Nov 79, 49p CALSPAN-8384-S-2, AFAL-TR-79-1187
Contract F33615-78-C-1617

This investigation demonstrated theoretically and experimentally that frequency-agile narrowband radar signatures can be derived from wideband data. The experimental work used X-band satellite data from Lincoln Laboratory's Long Range Imaging Radar (Haystack). The computer programs required for deriving narrowband signatures from two dimensional radar images were delivered to AFAL with this report. (Author)

AD-A088 514/5 PC **A08**/MF **A01**
Hughes Aircraft Co El Segundo CA Radar Systems Group
Target Identification Using Radar Imagery and Moment Methods.
Final rept. Sep 79-Jun 80,
George A. Ioannidis. Jun 80, 157p Rept nos. HAC-FR-80-23-919R, HAC-REF-E5599
Contract N00014-79-C-0643

In the past, most radar target recognition techniques have concentrated on the use of one-dimensionsal target signatures. However, the development of the Synthetic Aperture Radar (SAR) and the recent development of the Inverse Synthetic Aperture (ISAR) technologies have made it possible to obtain radar images of targets and thus allow the use of two-dimensional pattern classification schemes for automatic radar target recognition. One such two-dimensional shape recognition scheme is a technique known as the method of moments, which has been successfully applied to the recognition of objects imaged in the visible and infrared spectrum. The images used in this investigation were generated by the application of the ISAR technique to turntable radar data and also data obtained from flying aircraft targets.

N80-29573/6 PC **A04**/MF **A01**
Forschungsinstitut fuer Funk und Mathematik, Werthoven (Germany, F.R.).
Radar Technical Terminology.
E. Hanle. May 79, 55p FFM-269A
Text in German; English Summary.

A glossary of radar related terms is presented. The format consists of the German term, its definition, and its English translation. The glossary is intended as a standardized reference text.

N80-29574/4 PC **A03**/MF **A01**
Forschungsinstitut fuer Funk und Mathematik, Werthoven (Germany, F.R.).
On Integrating Data Processing in Systems of Netted Sensors.
G. Vankeuk. Nov 78, 29p FFM-280
Text in German; English Summary.

The scope and inherent problems of target data processing when sensor networks are involved are considered. The study is restricted to radar, sonar, and surface acoustic sensors. A distinction is made between the electronic signal processing of sensor output and the task of integrating the digital output of a variable system of distributed sensors. Both cases are discussed in terms of network software and examples of network analysis are given.

PAT-APPL-6-160 877 PC **A03**/MF **A01**
Department of the Navy Washington DC
Environmental Mapping System.
Patent Application,
Ben H. Cantrell. Filed 19 Jun 80, 30p AD-D007 413/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A circuit which detects environmental sources of echos received by a pulse-echo system such as a

radar and classifies the sources of the echo at each range resolution cell as either short-pulse interference, rain clutter or jamming, distributed land clutter, an isolated target or thermal noise. The circuit implements on the screen of a cathode ray tube a digital map of a selected echo source type by modulating the electron beam intensity with a binary digit (0 or 1) at each increment of the sweep corresponding to a range resolution cell. The circuit utilizes a pulse-to-pulse noncoherent subtraction to remove correlated echos, leaving only uncorrelated type echos. Short-pulse interference is then detected and the uncorrelated echo component is compared to thermal noise to determine if rain clutter or noise jamming is present. The threshold for either target detection or land clutter is determined from the uncorrelated echo component, and all correlated targets and land clutter are next detected. The correlated echos are separated into distributed land clutter and isolated targets by the following procedure: the isolated targets are required to have uncorrelated echos on each side of them in range. Finally, if no detection of any of these types is made, thermal noise is declared. (Author)

PAT-APPL-6-162 346 PC **A03**/MF **A01**
Department of the Navy Washington DC
Autocorrelation Sidelobe Reduction Device for Phase-Coded Signals.
Patent Application,
Bernard L. Lewis, and Frank F. Krestschmer.
Filed 23 Jun 80, 28p AD-D007 414/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A pulse compression decoder which oversamples by two the signal elements of a received phase-coded signal, performs a pairwise average on the signal elements at intervals equal to 1/2 the width of a signal element, reverse-codes the pairwise averages, combines the pairwise averages to form a sub-accumulation signal, and performs a pairwise average on the sub-accumulation signals at intervals equal to 1/2 the width of a signal element to produce a compressed pulse having a high peak-to-side lobe ratio. (Author)

18.

NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

AD-A088 056/7 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Beam Nonuniformity Effects on Laser Ablatively Accelerated Targets.
Memorandum rept.,
S. P. Obenschain, R. H. Lemberg, and B. H. Ripin. 20 Aug 80, 13p Rept no. NRL-MR-4309

A laser doppler shift technique gives the velocity profiles of ablatively accelerated targets. Measurements of the effects of laser beam nonuniformity on the target acceleration are presented and interpreted in the context of laser pellet fusion. (Author)

AD-A088 086/4 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Electron Cyclotron/Upper Hybrid Resonant Preionization in the ISX-B Tokamak.
Memorandum rept.,
R. M. Gilgenbach, R. F. Lucey, K. E. Hackett, K. E. Burrell, and M. Hacker. 20 Jun 80, 34p Rept no. NRL-MR-4248
Contract DOE-EX-77-A-34-1015

Preionization experiments have been performed on a tokamak by injecting about 80 kW of microwave power at 35 GHz for up to 15 ms. Microwave absorption occurs at the electron cyclotron and upper hybrid resonance frequencies as predicted by theory. Preionization causes substantial (40%) reductions in loop voltage during the initial phase of the tokamak shot. Flux (volt second) savings with preionization are about 30% in the first 2 ms or about 2% of the total flux expenditure in a tokamak shot. The plasma current starts 20 microsec earlier and rises 1.4 times more rapidly in the preionized case. Electron densities of 5 x 10 to the 12th power/cu cm can be sustained with only a toroidal magnetic field during microwave injection. The bulk electron temperature in the preionized plasma is about 10 eV although there are indications of higher electron temperatures (50 eV) in the upper hybrid resonance layer. During the early stages of ohmic heating the preionization is effective in decreasing the peak of the radiated power. (Author)

AD-A088 087/2 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Heating at the Electron Cyclotron Frequency in the ISX-B Tokamak.
Memorandum rept.,
R. M. Gilgenbach, M. E. Read, K. E. Hackett, R. Lucey, and B. Hui. 14 Aug 80, 17p Rept no. NRL-MR-4308
Contract DOE-EX-77-A-34-1015

We report results of electron cyclotron heating (ECH) experiments in which 80-kW of microwave power from a 35-GHz gyrotron is injected into a tokamak with large single pass absorption. For 10-ms microwave pulses, incident from the high field side of the torus, the central electron temperature increases from 850 eV to 1250 eV, in agreement with empirical transport code calculations. For the first time in a tokamak, we demonstrate that electron temperature scales linearly with ECH power. (Author)

AD-A088 274/6 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Tokamak Heating and Current Maintenance with Intense Pulsed Ion Beams.
Memorandum rept.,
W. M. Manheimer, and N. K. Winsor. 21 Aug 80, 63p Rept no. NRL-MR-4213

This paper examines tokamak heating with intense pulsed ion beams. It finds that plasma can be heated to ignition or to Q approximately 1 and depending on the injection scheme, the current can be maintained or even generated by the beam. (Author)

AED-Conf-77-524-001 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Heating of Fusion Plasmas by Neutral Injection.
R. Klingelhoefer, and 1977, 19p CONF-7709154-2
In German.41. physicists' meeting, Karlsruhe, F.R. Germany, 20 Sep 1977.
U.S. Sales Only.

The article first deals with a) the ignition temperature and the self-preservation conditions of a D-T plasma, b) plasma temperatures and confinement periods obtained with tokamaks so far, and c) with the limits of Ohmic heating. It then discusses d) the principle of plasma heating by neutral injection, e) the results obtained with injector heating so far, f) the layout of an injector, g) the heating power expected from the injectors of future tokamaks, and h) development tasks derived from the required depth of penetration of injected particles into the plasma. (Atomindex citation 09:393392)

BNL-26895 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Electrode Cooling for Long Pulse High Current Ion Sources.
R. B. McKenzie-Wilson. 1979, 5p CONF-791102-172
Contract AC02-76CH00016
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The need for cooling of electrode surface in ion sources for neutral beam line applications is summarized. The properties of possible cooling fluids are discussed and the decision to use water as a cooling fluid of choice is explained. The influence of source geometry on the design of a cooling canal is examined and two possible designs are presented. The need for model testing and the results of the tests on a model cathode are also discussed. Some remarks are also made on a method of predicting burnout failure of a cooled electrode. (ERA citation 05:029957)

BNL-27814 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
First Wall Thermal Hydraulic Models for Fusion Blankets.
J. A. Fillo. 1980, 8p CONF-800723-20
Contract AC02-76CH00016
19. national heat transfer conference, Orlando, FL, USA, 27 Jul 1980.

Subject to normal and off-normal reactor conditions, thermal hydraulic models of first walls, e.g., a thermal mass barrier, a tubular shield, and a radiating liner are reviewed. Under normal operation the plasma behaves as expected in a predicted way for transient and steady-state conditions. The most severe thermal loading on the first wall occurs when the plasma becomes unstable and dumps its energy on the wall in a very short period of time (milliseconds). Depending on the plasma dump time and area over which the energy is deposited may result in melting of the first wall surface, and if the temperature is high enough, vaporization. (ERA citation 05:029974)

BNL-27958 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Blanket Options for High-Efficiency Fusion Power.
J. L. Usher, O. W. Lazareth, J. A. Fillo, F. L. Horn, and J. R. Powell. 1980, 6p CONF-800806-25
Contract AC02-76CH00016
15. intersociety energy conversion engineering conference, Seattle, WA, USA, 18 Aug 1980.

The efficiencies of blankets for fusion reactors are usually in the range of 30 to 40%, limited by the operating temperatures (500 exp 0 C) of conventional structural materials such as stainless steels. In this project two-zone blankets are proposed; these blankets consist of a low-temperature shell surrounding a high-temperature interior zone. A survey of nucleonics and thermal hydraulic parameters has led to a reference blanket design consisting of a water-cooled stainless steel shell around a BeO, ZrO sub 2 interior (cooled by argon) utilizing Li sub 2 O for tritium breeding. In this design, approximately 60% of the fusion energy is deposited in the high-temperature interior. The maximum argon temperature is 2230 exp 0 C leading to an overall efficiency estimate of 55 to 60% for this reference case. (ERA citation 05:029939)

CEA-CONF-4125 PC **A02**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Present Status of Two R.F. Heating Schemes: I.C.R.H. And L.H.R.H.
T. Consoli. 1977, 15p CONF-770906-16
European conference on controlled fusion and plasma physics, Prague, Czechoslovakia, 19 Sep 1977.
U.S. Sales Only.

Among the large number of wave-plasma interaction, Ion-Cyclotron Resonant Heating (I.C.R.H.) and Lower Hybrid Resonant Heating (L.H.R.H.), are two promising additional R.F. heating schemes for toroidal hot plasma. They both offer the advantage of using power generators which requires a moderate development for next generation machines. It seems important to try to state in the limits of this paper the present experimental situation of these two R.F. heating methods as it results from the vast literature published from the last European Conference. (Atomindex citation 09:405777)

CEA-CONF-4126 PC **A02**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Recent Results on Ion Heating by T.T.M.P. on Petula.
R. Bardet, M. Bernard, and G. Briffod. 1977, 4p
CONF-770906-15
European conference on controlled fusion and plasma physics, Prague, Czechoslovakia, 19 Sep 1977.
U.S. Sales Only.

Transit Time Magnetic Pumping has been applied on the Petula Tokamak without pumpout and any undesirable effects. A 20-30% subsequent ion temperature increase was observed according to theory. (Atomindex citation 09:405749)

CEA-CONF-4565 PC **A02**/MF **A01**
CEA Centre d'Etudes de Limeil, Villeneuve-Saint-Georges (France).
Eight BEAMS Implosion Experiments at Limeil.
D. Billon, J. C. Couturaud, M. Decroisette, P. A. Holstein, and J. Launspach. 1978, 16p
U.S. Sales Only.

We report here first results obtained with 50 ps duration pulses. Shots were performed with DT filled glass microballoons with typical dimensions: 80 mu m in diameter, 0,8 mu m in wall thickness. X-ray pinhole photograph shows now a rather good sphericity of the core, whose emissivity is higher than that of the corona. The corona emission is not quite uniform on this shot, because best focusing conditions were not achieved there. The absorption for these first results ranges around 15%. Thus the absorbed energy per unit mass lies between 100 to 200 J/ mu g; the neutron yield is typically approximately 10 exp 7 . (Atomindex citation 11:506662)

CONF-791102-170 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Ring Power Balance Optimization in an EBT Fusion Reactor.
N. A. Uckan, S. K. Borowski, D. B. Batchelor, C. L. Hedrick, and E. F. Jaeger. 1979, 3p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The key element of the ELMO Bumpy Torus (EBT) concept is the presence of the relativistic hot electron rings (annuli) that are formed in each sector of the torus. If the plasma in a reactor is heated to ignition, the toroidal plasma heating will be turned off; the ring heating will, however, have to be sustained throughout the steady-state operation because these hot electron rings are essential for the stable operation of EBT. Therefore, the tradeoff between the quality of confinement afforded by the hot electron rings and the power required to sustain them represents an important consideration in a reactor. A simple power balance scheme for a reactor has been developed to determine the ring power losses on the reactor Q value. The results indicate that the drag cooling dominates the ring power balance for ring energies in the range of 100 to 600 keV. Although a broad minimum exists in the annulus power loss curves for optimization, the results are sensitive to the details of the scaling parameters assumed. Within the extreme cases of the assumptions, the overall system Q is in the range of 8 to 100. Detailed studies are under way to determine the dominant mechanisms that influence the ring performance. (ERA citation 05:029860)

CONF-800427-14 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Tritium in Fusion Reactor Components.
J. S. Watson, P. W. Fisher, and J. B. Talbot. 1980, 5p
Contract W-7405-ENG-26
Tritium technology in fission, fusion, and isotopic applications, Dayton, OH, USA, 29 Apr 1980.

When tritium is used in a fusion energy experiment or reactor, several implications affect and usually restrict the design and operation of the system and involve questions of containment, inventory, and radiation damage. Containment is expected to be particularly important both for high-temperature components and for those components that are prone to require frequent maintenance. Inventory is currently of major significance in cases where safety and environmental considerations limit the experiments to very low levels of tritium. Fewer inventory restrictions are expected as fusion experiments are placed in more-remote locations and as the fusion community gains experience with the use of tritium. However, the advent of power-producing experiments with high-duty cycle will again lead to serious difficulties based principally on tritium availability; cyclic operations with significant regeneration times are the principal problems. (ERA citation 05:029971)

CONF-800455-12 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Arcing Studies in ISX-B.
R. E. Clausing, L. C. Emerson, and L. Heatherly. 1980, 9p
Contract W-7405-ENG-26
International conference on plasma surface interactions in controlled fusion devices, Garmisch, F.R. Germany, 21 Apr 1980.

Results of experimental measurements of arcing in ISX-B are described. Samples of stainless steel were exposed at the plasma edge and arcing currents to the sample were measured. Currents from several amperes up to 100 amperes were observed. It was possible to trigger arcs during well-behaved discharges by applying a high voltage to the sample. Elemental analysis of surface features of samples has shown that sulfur segregates to surfaces of arc craters in type 304 stainless steel. Detection of sulfur on surface samples may be related to arcing during cleanup processes in tokamaks. (ERA citation 05:029882)

COO-2387-120 PC **A02**/MF **A01**
Wisconsin Univ.-Madison.
Tokamak Startup with Electron Cyclotron Heating.
D. J. Holly, S. C. Prager, D. A. Shepard, and J. C. Sprott. Apr 80, 14p
Contract AS02-76ET53051

Experiments are described in which the startup voltage in a tokamak is reduced by approx. 60% by the use of a modest amount of electron cyclotron resonance heating power for preionization. A 50% reduction in volt-second requirement and impurity reflux are also observed. (ERA citation 05:029958)

COO-5125-2 PC **A02**/MF **A01**
Wisconsin Univ.-Madison.
Investigation of Barrier Cell and Auxilliary Heating in a Tandem Mirror. Annual Progress Report, October 1, 1979-September 30, 1980.
J. Kesner, G. A. Emmert, and J. E. Howard. Jun 80, 8p
Contract AC02-79ET53083

A number of areas relating to RF heating and thermal barrier formation in a tandem mirror have been investigated. The possibility of creating axisymmetric confinement through the use of sloshing-ions has been investigated. We have also suggested the complimentary concept of sloshing-electrons. Self-consistent thermal barrier formation has been studied and ion drift orbits in non-axisymmetric barriers are being investigated. The study of dynamic stabilization of the DCLC by RF fields has been extended to omega near 2 omega /sub ci/; significant stabilization is found. Fast and slow wave heating have been extensively studied using single particle theory. A new theory of relativistic ECH is under development. (ERA citation 05:029861)

DOE/DP/40039-1 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Nuclear Engineering.
Systems Assessment of Heavy Ion Beam Fusion Drivers. Final Report, January 1, 1978-December 31, 1979.
T. Kammash, C. R. Drum, and R. D. Theisen. May 80, 44p
Contract AC08-79DP40039

A systems analysis for a fusion reactor utilizing a heavy ion beam-pellet fusion is carried out to evaluate the performance of several potential drivers. These include the two proposed by the Argonne National Laboratory, namely Hearthfire Reference Concepts 2 and 3; the RF linear accelerator proposed by the Brookhaven National Laboratory; and the Induction Linac System advanced by the Lawrence Berkeley Laboratory. It is shown that accelerator systems utilizing rapid cycling synchrotrons are the least attractive drivers unless the efficiency of this component is sufficiently improved. Using a power cost-formula that accounts for the accelerator operating cost it appears on the basis of available data that only one driver might fall within the economically acceptable range of producing electric power at 4 cents a kilowatt hour but only if certain optimistic conditions are met. (ERA citation 05:029976)

DOE/ER-0062 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Office of Fusion Energy.
Compact Toroid Theory Planning Workshop. A Panel Report to the Director, Division of Applied Plasma Physics, Office of Fusion Energy.
Jul 80, 21p

The purpose of the Workshop was to identify the most important physics issues that need to be addressed in the near term in order to assure the optimal design and timely interpretation of Compact Toroid (CT) experiments. The Panel was also asked to assess the levels of effort required to obtain priority information on appropriate time scales compatible with DOE plans to design a CT proof-of-principle experiment. The fiscal year cost anticipated for the effort recommended by the Workshop Panel (excluding costs for computing) is estimated to be approximately $5.7M. CT theory is currently funded at a level of approximately $2.0M per year. (ERA citation 05:031363)

EUR-CEA-FC-916 PC **A05**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
TFR-600 Tokamak.
Nov 77, 77p
In French.
U.S. Sales Only.

The new step of the Tokamak TFR, TFR 600, is described with its different aspects: physical objectives, modifications of the vacuum chamber and of the poloidal circuit, additionnal heatings. The nominal characteristics are: R=98 cm; a<=24 cm; Bsub(T)<=6T; Isub(p)<=600 kA. The three additionnal heatings have the following characteristics: - neutral injection: 1,2 MW of H exp 0 or D exp 0 at 40 keV (power transmitted to the plasma); - ion cyclotron radiofrequency heating: 600 kW in the bandwidth 55-83 MHz; - and cluster injection: 100 KW at 600 keV (average mass of the H exp 0 clusters: 100-200 A.MU) . (Atomindex citation 09:409377)

EUR-CEA-FC-992 PC **A10**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Formaton of H sub 1- Negative Ions and H exp 0 Atoms by Proton Charge Exchange on Molecular Targets in the Energy Range 1 to 20 KeV.
M. Eliot. Feb 79, 222p
In French.Thesis.
U.S. Sales Only.

The study of the formation of H exp - negative ions from a beam of protons by collision on molecular gaseous targets was undertaken to meet the information requirements of physicists who are at present developing very high intensity ion sources in order to obtain beams of neutral H exp 0 for heating plasmas in Tokamak type machines. The spectroscopy work by double transfer of charges, effected in the last few years by Durup et al. (1973), showed that relatively high fractions at equilibrium F-1 infinity could be expected to be obtained on hydrocarbonated targets. This work was therefore concerned with studying and determining the fractions at equilibrium F-1 infinity obtained by passing a beam of protons, between 1 and 20 keV in energy, through various molecular targets such as those in the methane, ethylene, etc., series. Another field of interest of this study was to measure the cross-sections of single and double transfers

of H exp + ion charges on these various targets, a field where there is very little data at the present time. In the first part, a brief description is given of the general framework of a collision between two particles and the various approximations which are mostly applied in the charge exchange process study. Although these theories have been developed only for ion-atom or atom-atom collisions, they are applied, with all the reservations that this implies, to the concrete cases to be studied and the theoretical results are compared with the experimental ones. The second part is devoted to the description of the experimental rig, method of measurement employed to determine the cross-sections and, lastly, to the experimental results obtained. (Atomindex citation 11:506676)

EUR-CEA-FC-995(pt.1) PC **A08**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Annual Progress Report of the Fontenay-aux-Roses Research Group. January 1 to December 31 1978.
170p
In French.
U.S. Sales Only.

Within the context of the TFR programme, the problem of balance again filled a significant place in 1978. The 1978 work resulted in partial successes only from the practical angle by ensuring long discharges of 150 to 200 KA, but they made it possible to reach a comprehensive understanding of the problem by using a sophisticated digital model that is a very good representation of the change in the plasma connected to outside circuits. Despite some technical difficulties, it was fortunately possible to obtain fine results on the ionic cyclotron heating. Significant progress was made in the field of diagnoses, particularly local temperature measurements and resolved with time which are so important for the development of heating methods and for the studies of pure physics. With the improvements also made in the other domains, TFR once more possesses a panoply of diagnoses that has not many equals. Another important event was the order for nine sources of the circular periplasmatron type by the I.P.P. of Garching to fit out the neutral injection lines of ASDEX. In the area of neutrals, the development work on JET, being pursued vigorously, should also be noted. Then there is also the franco-sovietic cooperation work with TI0, particularly for the measurement of the electronic temperature by cyclotronic emission. Last, the TFR 604 and TORE II projects have undergone some change, the first with respect to the injection of 4MW tangential neutrals into the plasma and the second concerning the use of superconducting coils (TORE II SUPRA version) to create the toroidal field. (Atomindex citation 11:509696)

FEI-915 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Influence of Transient Effects Caused by a Nonuniformity on Thermoelectric Thermometers Readings.
M. I. Redchenko, A. A. Fraktovnikova, and A. S. Kruglov. 1979, 10p
In Russian.
U.S. Sales Only.

To account for the effect of radiation defects on readings of thermoelectric thermometers (TT) laboratory TTVR5/20 tests with electrodes having different artificially created thermoelectric inhomogeneity are conducted. The character of graduation characteristic change in the process of sample heating at different temperature distributions in the sections with thermoelectric inhomogeneity is considered. It is found that thermoelectrically inhomogeneous over their length thermometers in graduation process as compared to thermoelectrically homogeneous thermometers change the sign in their readings at low temperatures (approximately 250 deg C), and their readings depend on the temperature distribution over the length. Internal reactor tests of thermoelectric thermometers in the BR-10 reactor during irradiation by neutron fluence up to approximately 10 exp 21 n/cm exp 2 at different reactor power (from 0 to 5 M W) and different heating regimes are conducted. It is shown, that at graduation of the irradiated TT at different temperature regimes their behaviour responds to regularities, characteristic of thermoelectrically inhomogeneous over the length TT. Transient, which might appear when temperature measuring in the process of irradiation at different power levels might be mainly related to different temperature distribution over the length in TT. (Atomindex citation 11:509262)

GA-A-15899 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Optimization and Control of the Plasma Shape and Current Profile in Noncircular Cross-Section Tokamaks.
R. W. Moore, L. C. Bernard, V. S. Chan, R. H. Davidson, and D. R. Dobrott. Jun 80, 15p IAEA-CN-38/J-5, CONF-800707-13
Contract AT03-76ET51011
International conference on plasma physics and controlled nuclear fusion research, Brussels, Belgium, 1 Jul 1980.

High- beta equilibria which are stable to all ideal MHD modes are found by optimizing the plasma shape and current profile for doublets, up-down asymmetric dees, and symmetric dees. The ideal MHD stability of these equilibria for low toroidal mode number n is analyzed with a global MHD stability code, GATO. The stability to high-n modes is analyzed with a localized ballooning code, BLOON. The attainment of high beta is facilitated by an automated optimization search on shape and current parameters. The equilibria are calculated with a free-boundary equilibrium code using coils appropriate for the Doublet III experimental device. The optimal equilibria are characterized by broad current profiles with values of beta /sub poloidal/ approx. =1. Experimental realization of the shapes and current profiles giving the highest beta limits is explored with a 1 1/2-D transport code, which simulates the time evolution of the 2-D MHD equilibrium while calculating consistent current profiles from a 1-D transport model. Transport simulations indicate that nearly optimal shapes may be obtained provided that the currents in the field-shaping coils are appropriately programmed and the plasma current profile is sufficiently broad. Obtaining broad current profiles is possible by current ramping, neutral beam heating, and electron cyclotron heating. With combinations of these techniques it is possible to approach the optimum beta predicted by the MHD theory. (ERA citation 05:029881)

GA-A-15924 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Ripple Burn Control.
D. K. Bhadra, T. W. Petrie, U. A. Peuron, and J. M. Rawls. May 80, 29p CONF-800685-1
Contract AT03-76ET51011
INTOR meeting, Vienna, Austria, 16 Jun 1980.

The ripple contribution to the ion thermal conductivity is ideally suited in magnitude, temperature dependence, and spatial dependence to serve as a burn control mechanism. Furthermore, a considerable measure of automatic burn control results because of the radial shift of the plasma to a region of higher ripple. Unfortunately, the window in ripple values consistent with both ignition and a burn equilibrium is uncomfortably narrow, given the current lack of contact between the theoretical models of ripple transport and experimental observations. A survey is made of the techniques to vary the ripple and thus broaden the design window. One new technique is discussed in some detail: the use of ferromagnetic materials in the shield with magnetic properties which are sensitive functions of the operating temperature. (ERA citation 05:029951)

GA-A-15951 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Shaping and Characteristics of Ohmically Heated Noncircular Plasmas in Doublet III.
J. C. Wesley, T. Angel, and C. J. Armentrout. Jun 80, 13p CONF-800707-15
Contract AT03-76ET51011
International conference on plasma physics and controlled nuclear fusion research, Brussels, Belgium, 1 Jul 1980.

Ohmically heated dee, droplet and doublet plasmas with vertical elongations of up to 3.2 have been produced in Doublet III. Doublet configurations are now obtained by controlled merging of the two current channels of a droplet discharge. All discharges have low levels of impurities and central radiated power and achieve high density relative to B/sub T//R scaling. The energy confinement follows the standard circular cross-section Alcator scaling law. The lack of significant improvement in the confinement due to vertical elongation is consistent with the high degree of current peaking inferred from magnetic measurements. (ERA citation 05:029864)

HEDL-SA-2145-FP PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Fusion Materials High Energy-Neutron Studies. A Status Report.
D. G. Doran, and M. W. Guinan. 1980, 36p CONF-800551-14
Contract AC14-76FF02170
Symposium on neutron cross sections from 10 - 50 MeV, Upton, NY, USA, 12 May 1980.

The objectives of this paper are (1) to provide background information on the US Magnetic Fusion Reactor Materials Program, (2) to provide a framework for evaluating nuclear data needs associated with high energy neutron irradiations, and (3) to show the current status of relevant high energy neutron studies. Since the last symposium, the greatest strides in cross section development have been taken in those areas providing FMIT design data, e.g., source description, shielding, and activation. In addition, many dosimetry cross sections have been tentatively extrapolated to 40 MeV and integral testing begun. Extensive total helium measurements have been made in a variety of neutron spectra. Additional calculations are needed to assist in determining energy dependent cross sections. (ERA citation 05:030009)

HEDL-SA-2146-FP PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Nuclear Data Relevant to Shield Design of FMIT Facility.
L. L. Carter, R. J. Morford, and A. D. Wilcox. Apr 80, 30p CONF-800551-15
Contract AC14-76FF02170
Symposium on neutron cross sections from 10 - 50 MeV, Upton, NY, USA, 12 May 1980.

Nuclear data requirements are reviewed for the design of the Fusion Materials Irradiation Test (FMIT) facility. This accelerator-based facility, now in the early stages of construction at Hanford, will provide high fluences in a fusion-like radiation environment for the testing of materials. The nuclear data base required encompasses the entire range of neutron energies from thermal to 50 MeV. In this review, we consider neutron source terms, cross sections for thermal and bulk shield design, and neutron activation for the facility. (ERA citation 05:030010)

HEDL-SA-2147-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Simulation of Short-Term Annealing of Displacement Cascades in FCC Metals.
H. L. Heinisch, D. G. Doran, and D. M. Schwartz. 1980, 17p CONF-800609-9
Contract AC14-76FF02170
10. international symposium on effects of radiation on materials, Savannah, GA, USA, 3 Jun 1980.

Computer models have been developed for the simulation of high energy displacement cascades. The objective is the generation of defect production functions for use in correlation analysis of radiation effects in fusion reactor materials. In particular, the stochastic cascade annealing simulation code SCAS has been developed and used to model the short-term annealing behavior of simulated cascades in FCC metals. The code is fast enough to make annealing of high energy cascades practical. Sets of cascades from 5 keV to 100 keV in copper were generated by the binary collision code MARLOWE. (ERA citation 05:030011)

HEDL-SA-2148 PC **A04**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.

Cross Sections Required for FMIT Dosimetry.
R. Gold, W. N. McElroy, E. P. Lippincott, F. M. Mann, and D. L. Oberg. 2 May 80, 56p CONF-800551-18
Contract AC14-76FF02170
Symposium on neutron cross sections from 10 - 50 MeV, Upton, NY, USA, 12 May 1980.

The Fusion Materials Irradiation Test (FMIT) facility, currently under construction, is designed to produce a high flux of high energy neutrons for irradiation effects experiments on fusion reactor materials. Characterization of the flux-fluence-spectrum in this rapidly varying neutron field requires adaptation and extension of currently available dosimetry techniques. This characterization will be carried out by a combination of active, passive, and calculational dosimetry. The goal is to provide the experimenter with accurate neutron flux-fluence-spectra at all positions in the test cell. Plans have been completed for a number of experimental dosimetry stations and provision for these facilities has been incorporated into the FMIT design. Overall needs of the FMIT irradiation damage program delineate goal accuracies for dosimetry that, in turn, create new requirements for high energy neutron cross section data. Recommendations based on these needs have been derived for required cross section data and accuracies. (ERA citation 05:031401)

HEDL-SA-2149 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
CR-39 Polymer, a Promising New Solid State Track Recorder for High Energy Neutron Applications.
F. H. Ruddy, C. C. Preston, R. Gold, E. V. Benton, and J. H. Roberts. 14 Apr 80, 22p CONF-800551-20
Contract AC14-76FF02170
Symposium on neutron cross sections from 10 - 50 MeV, Upton, NY, USA, 12 May 1980.

CR-39 Polymer, a new solid state track recorder with unprecedented sensitivity to lightly ionizing particles (such as protons) is being developed for eventual neutron dosimetry applications in the Fusion Materials Irradiation Test Facility and elsewhere. The diameters of proton tracks have been found to vary smoothly and reproducibly as a function of energy from 0.20 to 18.0 MeV. Preliminary results on the response of CR-39 polymer to proton tracks as a function of angle show a rapid decrease of the registration efficiency from 100% to 0 for angles of incidence less than 75 exp 0 . Proton recoil track size distributions in CR-39 polymer irradiated with monoenergetic neutrons of varying energy are presented. Some proposed high energy neutron dosimetry and radiography systems using CR-39 polymer are discussed. (ERA citation 05:030012)

IAE-2860 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Stability of Internal Helical Mode in a Tokamak with a High-Pressure Plasma.
A. M. Krymskii, and A. B. Mikha lovskii. 1977, 12p
In Russian.
U.S. Sales Only.

The internal helical mode stability in a circular-section axisymmetric tokamak containing high-pressure plasma is investigated. The effect of magnetic well deepening due to magnetic axis curvature and ballon effects which are typical only of a nonuniform longitudinal magnetic field on the internal helical mode stability is considered.It is shown that this mode is actually a hybride of two-flute and current- instabilities. It has been found that internal helical mode (m=1) instability can disappear when beta sub(l)>1 . Stabilization is due to magnetic well deepening in a manner similar to the case of small-scale flute instabilities. (Atomindex citation 10:443033)

IAE-2879 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Calculation of Neutral Flux to the First Wall in a Tokamak with Injection.
A. S. Kukushkin, V. I. Pistunovich, and S. V. Putvinskii. 1977, 16p
In Russian.
U.S. Sales Only.

The results of Monte-Carlo calculations of the characteristics of the neutral component produced in a tokamak plasma upon injection of a neutral beam are presented. The calculations were made for two large T-200 devices and a "tokamak reactor" with plasma parameters in the reactor range. Such characteristics of the neutral component as the density distribution along the radius, the energy spectrum of the charge exchange neutrals both inside the plasma and those ejected on the wall and their distribution over the chamber surface were obtained for different values of injection energy. The calculation results show, in particular, that the injection energy of the neutrals must be sufficiently high (E(>=) 100-200 keV). At low values of the beam injection energy a local release of charge exchange neutrals on the chamber wall takes place, which may result in considerable sputtering of the wall material. (Atomindex citation 10:434647)

IAE-3111 PC **A04**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
BURNFL Program for Calculation of Isotope Composition Change in a Thermonuclear Reactor Blanket.
S. V. Marin. 1979, 53p
In Russian.
U.S. Sales Only.

The BURNFL program intended for calculating the change in the isotope composition of the thermonuclear reactor blanket in one-dimension geometry is described. A set of differential equations, describing the process of formation and burnup of initial fuel isotopes and formed as a result of nuclear reactions, is solved by one of the methods: by the Runge-Kutt method of the fourth order; by expansion of exponential from matrix argument, by the predictor-corrector method with the Adams and Gear schemes for stiff systems. The calculation of spatial-energy distribution of neutron fluxes for each fixed time moment is made in the multigroup approximation by the Monte-Carlo method and by the method of spherical harmonic p sub 1 -approximation with jointing solutions at some limiting energy value. The BURNFL program permits to determine the values of isotope nuclear densities in a fixed time moment, as well as main blanket functionals and nuclear reaction rates. The calculated blanket model can include 15 geometrical zones with different compositions. The total number of points in the scheme of space division (nodal points) must not exceed 100. Solution of a set of differential equations by the method of expansion of exponential from matrix argument using the arithmetic with double accuracy takes 1-2 min. The most characteristic time of counting with acceptable accuracy during one time interval amounts 4-5 min. The program is written in the FORTRAN language for the BESM-6 computer and intended for the operation in the operating systems of Dubma and Dispak. (Atomindex citation 11:506716)

IAE-3123 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Radiation Losses in the T-10 Tokamak.
A. N. Vertiporokh, S. Yu. Luk'yanov, and Yu. S. Maksimov. 1979, 17p
In Russian.
U.S. Sales Only.

Results of experimental investigation into radiation losses of hot plasma in the T-10 Tokamak under joule heating conditions are presented. The relationship of radiation losses, resulted from recharging processes, and discharge parametors is studied. A space-time character of radiation distribution is considered; the effect of diaphragm material on the loss value is discussed. Pyroelectric detectors made of lithium niobate were used for the registering of radiation losses. The registering efficiency of electromagnetic radiation in the range from visible region to X-ray region and 0.1-10 keV recharging neutrals is close to 100%. The main part of the experiments were carried out in the regimes with a longitudinal magnetic field B=3T and discharge current I approximately equal to 0.4 MA. Mean electron density was anti nsub(e) approximately equal to (4-5)x10 exp 13 cm exp -3 at Tsub(e) (0) approximately equal to 1 keV. In the experiments different type diaphragms were used: 1) W-Mo diaphragm with 36.7 cm radius, alloy composition is 85% W and 15% Mo; 2) (W-Mo) sub 1 diaphragm with an additional element of W-Mo alloy, introduced into the chamber by 2 cm from the lower side of the torus; 3) C sub 1 -diaphragm is made of W and Mo and as well, but with an additional carbon element introduced from the outside of the torus by 3 cm. It is shown, that in macroscopically stable regimes the radiation losses play the determining role in energy balance of plasma, constituting about 70% ohmic power. The main plasma components responsible for the radiation are multiply charged ions of heavy impurities: tungsten and elements of iron group. Using the C sub 1 diaphragm in comparison with the W-Mo diaphragm resulted in decreasing radiation losses and their share in the total plasma balance. (Atomindex citation 11:506755)

INDC(SEC)-70/GA PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
Minutes of the Fourth Meeting of the Joint IFRC/INDC Subcommittee on Atomic and Molecular Data for Fusion. Vienna, 30 September 1978.
A. Lorenz, and R. E. Seamon. Oct 78, 20p CONF-7809152-1
Meeting of the joint IFRC/INDC subcommittee on atomic and molecular data for fusion, Vienna, Austria, 30 Sep 1978.
U.S. Sales Only.

This paper reports on the Fourth Meeting of the Joint IFRC/INDC Subcommittee on Atomic and Molecular Data for Fusion held in Vienna, 30 September 1978. Main topics are: a) The progress of the Atomic and Molecular Data Unit of IAEA. (Bulletin on A+M data, Atomic data Collision Index). b) The proposals for the future IAEA program on atomic and molecular data for fusion. (Atomindex citation 10:434660)

INIS-mf-4125 PC **A12**/MF **A01**
Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu.
Controlled Fusion and Plasma Physics. Vol. II.
272p CONF-770906-P2
European conference on controlled fusion and plasma physics, Prague, Czechoslovakia, 19 Sep 1977.
U.S. Sales Only.

Separate abstracts for each paper were entered into the data base. (ERA citation 04:040003)

IPP-9/30 PC **A03**/MF **A01**
Association Euratom-CEA, Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Application of GWAASS Experiments for Measuring the Ion Temperature, the Particle Density and the Particle Fluxes at the Plasma Boundary.
G. Staudenmaier, R. Behrisch, P. Staib, W. Eckstein, and J. Roth. Jul 79, 31p
U.S. Sales Only.

Clean carbon probes have been exposed at different positions to the plasma in the limiter shadow of TFR 600 for a certain number of discharges. After exposure the probes have been analysed with the D(exp 3 He,p) exp 4 He nuclear reaction in respect to the amount of trapped deuterium. The results have been compared with trapping curves for deuterium in carbon obtained under well defined conditions. This allowed to get information about the ion temperature, the ion density and the ion fluxes for the plasma in the scrape off region. (Atomindex citation 11:506743)

IPPJ-DT-58 PC **A07**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
On-Line Experimental Data Processing System for JIPP T-2.
K. Tsuda. Aug 78, 136p
In Japanese.
U.S. Sales Only.

A large computer system has been installed at the Plasma Physics Institute of Nagoya University for data processing in plasma physics experiments.

The system is composed of three computers: FACOM M-190 as the host computer; PANAFACOM U-400 as the front computer; and HITAC 10-2 as the front-end computers. This document provides information about the hardware and software structures of this system and the details of subsystem of each software. Also system design, function of each computer, input output processing system, interfaces between the front-end computers (minicomputer), interface with the 32-channel AD converter, and the examples of output are described. (Atomindex citation 11:497475)

IPPJ-DT-60 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Report of the Study Meeting on the Interaction Between Plasma and the First Wall of a Fusion Reactor.
Akira Miyahara, Kenya Akaishi, Takaichi Kawamura, Zenzaburo Kabetani, and Akio Sagara. Dec 78, 13p CONF-7807100-1
In Japanese.Meeting on the interaction between plasma and the first wall of a fusion reactor, Nagoya, Japan, 24 Jul 1978.
U.S. Sales Only.

The study meeting on the interaction between plasma and the first wall of a fusion reactor was held from July 24 to July 27, 1978. At this meeting, discussions were made on the interaction between plasma and wall and the effect of impurities. Reports on the ISS observation concerning the Mo surface as a limiter, on the measurement of sputter rate by a microbalance, on the surface roughness of the materials for the first wall at the atomic order, on the selective sputtering of binary alloys, and on the physical and chemical sputtering on the material surface of C and SiC were also presented. The research projects of the Institute of Plasma Physics and Hokkaido University were introduced. Collaboration of two groups was considered. (Atomindex citation 11:506720)

IPPJ-366 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Preliminary Experiments of Lower Hybrid Heating in Tokamak Plasma on JIPP T-II.
K. Ohkubo, and K. Matsuura. Feb 79, 19p
U.S. Sales Only.

Experiments on lower hybrid heating have been carried out in tokamak plasma on JIPP T-II. At plasma density (1.4 - 2.4) x 10 exp 13 cm exp -3 , toroidal magnetic field 26.4 kG, rf frequency 0.8 GHz and rf power to torus 60 kW, we observed effective ion heating as high as 100 eV and no high-energy tail in the parallel energy spectrum. Heating of electrons and ions is discussed on the basis of energy balance and turning point of lower hybrid wave. The increases of electron density and loop voltage are also described. (Atomindex citation 11:506728)

IPPJ-378 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Shaping of Ferromagnetic Wall for Linked Min.-B Configuration.
K. Ikuta. Mar 79, 12p
U.S. Sales Only.

A possibility to form a linked minimum-B configuration by the use of ferromagnetic materials is studied analytically. In particular both l = 2 and l = 3 cases are investigated in detail. By arrangement of the helically modulated, bumpy wall in a periodical array, the linked minimum-B system is able to be constructed. A typical case of wall arrangement is also illustrated. (Atomindex citation 11:506694)

IPPJ-380 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Charge State Distribution of Multiply-Charged Ions Extracted from ECR-Plasma.
A. Matsumoto, S. Aihara, S. Ohtani, K. Okuno, and S. Tsurubuchi. Apr 79, 19p
U.S. Sales Only.

An ion source based on the ECR-heating in a magnetic field has been developed in order to apply it to atomic collision experiments. Extracted ions were observed up to Ar exp 8+ and N exp 5+ . From the charge state distribution observed, the confinement time of ions is estimated for each charge state. (Atomindex citation 11:506718)

JAERI-M-7199 PC **A07**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Design Study of Cooling System for Tokamak Fusion Reactor.
Sep 77, 135p
In Japanese.
U.S. Sales Only.

Design study of the reactor cooling system for a tokamak fusion reactor has been carried out. In the cooling system of an experimental 150 MWt fusion reactor, to grasp the plant concept and clarify the R and D items the main cooling system and the tritium recovery system were designed and the auxiliary system was examined. In the cooling system of a commercial 2000 MWt fusion reactor, to study the plant and environment safety the main cooling system and the tritium recovery system were designed, including the evaluation of water leakage and tritium penetration in the steam generators. (Atomindex citation 09:405807)

JAERI-M-7293 PC **A07**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Design Study of Fuel Circulating System for Tokamak Experimental Fusion Reactor.
Oct 77, 139p
In Japanese.
U.S. Sales Only.

Design study of the fuel circulating system (FCS) for a tokamak experimental fusion reactor has been carried out. The FCS consists of main vacuum system, fuel gas refiners, isotope separators, neutral beam injector and fuel feed system. Cryopump vacuum system, fuel gas refiners of Pd-alloy membrane, and isotope separators of Pd-alloy membrane were mainly studied. Design parameters are: 16 cryosorption pumps, each-cryosorption-pump rate 3.3 x 10 exp 5 l/sec, 12 fuel gas refiners, each-refiner effective surface area 820 cm exp 2 , 47 isotope separators (in 1st cascade) and 46 (in 2nd), each-separator effective surface area -- 2,600 cm exp 2 (in 1st cascade) and -- 22,000 cm exp 2. (Atomindex citation 09:405808)

JAERI-M-7360 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Three-Dimensional Analysis of the Effects of Penetrations on Radiation Shielding of a Tokamak Fusion Reactor.
T. Ide, Y. Seki, and H. Iida. Nov 77, 35p
In Japanese.
U.S. Sales Only.

Effects of neutron streaming through neutral beam injection ports have been studied for the experimental fusion reactor designed in JAERI. The radiation damage of toroidal field (TF) coils in the presence of cylindrical injection ports with 1.2 m diameter was estimated by three-dimensional Monte Carlo calculation. To protect the TF coils from neutron streaming, 0.8 m thick shield is sufficient. The presence of the injection ports, however, increases substantially radiation damage of the TF coils. (Atomindex citation 09:405798)

JAERI-M-7364 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Numerical Stress Analysis of Toroidal Coil by Three-Dimensional Finite Element Method.
H. Nishimura, and S. Shimamoto. Oct 77, 55p
U.S. Sales Only.

A structure analysis program based on finite element method for toroidal coils, developed in JAERI, and its example application to a medium-size tokamak are described. In this application, the effects of material anisotropy, poloidal field and spring constant value were studied, and also the influence of toroidal coil failure on the peak stress. The following were revealed. The effect of anisotropy on the peak stress in reinforcement must be considered. The effect of poloidal field on the peak stress is small compared with that of toroidal field. The spring constant value between coil and support does not much influence the peak stress value, The peak stress in reinforcement rises with increasing number of failed coils. In the case of 2000 nodes on the structure, CPU time with the program is about 40 min. (Atomindex citation 09:405854)

JAERI-M-7397 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Spectroscopic and Bolometric Measurements of Radiation Loss in DIVA.
M. Shiho, K. Odajima, T. Sugie, H. Maeda, and S. Kasai. Nov 77, 29p
U.S. Sales Only.

Radiation loss due to low- and high-z impurities in DIVA (JFT-2a) was measured by means of a calibrated 3m grazing incidence vacuum monochromater and a calibrated pyroelectric detector. The following results were obtained: 1) Radiation loss power due to low-z impurities becomes insignificant by using clean surfaces for the vacuum wall. 2) Radiation loss power due to pseudo continuum from high-z impurities has influence on the energy balance of the confined plasma. 3) The divertor reduces the radiation loss by a factor of about 3. (Atomindex citation 09:405886)

JAERI-M-7431 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Low-Frequency Oscillations at High Density in JFT-2.
M. Maeno, M. Katagiri, N. Suzuki, and N. Fujisawa. Dec 77, 20p
In Japanese.
U.S. Sales Only.

Low-frequency oscillations in a plasma were measured with magnetic probes and Si surface-barrier detectors, and behaviour of the high density plasmas was studied. The plasma current profile in the phase of decreasing density after the interruption of gas input is more peaked than during gas input. The introduction of hydrogen during a discharge results in a reduction of the impurities flux. The increase of density by fast gas input is limited with a negative voltage spike. Immediately before a negative voltage spike, oscillations of m=1,2 grow, leading to the spike. (Atomindex citation 09:405836)

JAERI-M-7432 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Radiative Cooling in the Outer Edge of a Tokamak Plasma by Low-Z Impurities.
M. Nagami. Dec 77, 16p
U.S. Sales Only.

Radiative cooling capabilities of partially stripped low-Z impurities (carbon, oxygen and neon) in a tokamak plasma have been studied. In DIVA-sized tokamak, with the most probable diffusion model (neoclassical diffusion superposed by anomalous diffusion) of recycling impurities, the radial density distributions of individual ionization states are calculated and the loss power due to line radiation is evaluated. In the outer edge region of the discharge, the impurities recycling from and to the wall deviate from the local coronal equilibrium and the radiation power is greater by a factor of about 20 than estimated from the coronal equilibrium state. Width of this intensive cooling layer is determined by the ionization energy of Li-liked state, so that neon gives the largest layer in the outer edge of the discharge with the highest radiation intensity. (Atomindex citation 09:405846)

JAERI-M-7457 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Scaling for Scrape-off Layer Plasma in Tokamak.
Y. Shimomura, H. Maeda, H. Kimura, M. Azumi, and K. Odajima. Dec 77, 6p
U.S. Sales Only.

Scaling for a scrape-off layer plasma in a tokamak is obtained by using DIVA (JFT-2a). The scaling gives the average electron temperature, the width and the mean electron density of the scrape-off layer. The temperature at the edge will be high in a future large tokamak with a small energy-loss by charge-exchange and radiation. The scrape-off layer plasma can easily shield the impurity influx from the wall. The fuel, however, can easily penetrate into the main plasma. (Atomindex citation 09:409593)

JAERI-M-7551 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Fast Ion Spatial Distribution in Neutral Beam Injection into a Tokamak.
M. Ohtsuka, K. Tani, H. Kishimoto, R. Shimada, and H. Yoshida. Mar 78, 20p

In Japanese.
U.S. Sales Only.

Radial distribution of fast ions in neutral beam injection into a Tokamak is calculated. Injected neutral particles are ionized by plasma ions and electrons and confined in the Tokamak magnetic field. The purpose is to obtain a computer code in which there is no density divergence due to the pencil beam approximation and which can be connected with a one-dimensional Tokamak simulation code. It is assumed that fast ions move on the magnetic surfaces and are distributed uniformly in toroidal and poloidal directions. Equations are derived for the neutral beam of finite cross section injected with an arbitrary injection angle. Numerical calculation for JT-60 shows that the density divergence does not take place in the code. Comparison of this calculation and that by pencil beam approximation shows that the latter gives good approximate values for JT-60 if the approximation is a little modified. (Atomindex citation 10:443070)

JAERI-M-7825 PC **A10**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Repair/Maintenance Design for Tokamak Experimental Fusion Reactor.
Oct 78, 215p
In Japanese.
U.S. Sales Only.

Repair and maintenance design for JXFR has been studied. The reactor is in eight modules so that a damaged module alone can be separated from the other modules and transferred from the reactor room to a repair shop. Design work covers overhaul procedure, dismounting equipments (overhead cranes, auto welder/cutter and remote handling equipments), transport system of a module (module mounting carriages and rotating carriage), repair equipment for blanket, earthquake-proof analysis of the reactor, reactor room structure, repair shop layout, management of radioactive wastes, time and the number of persons required for overhaul etc. Though the repair and maintenance system is almost complete, there still remain problems for further study in joints of blanket cooling piping, auto welder/cutter and earthquake-proof strength in reactor disassemblage. More detailed studies and R and D are necessary for engineering perfection. (Atomindex citation 11:495602)

JAERI-M-7963 PC **A09**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Safety Analysis of Superconducting Toroidal Field Magnet for Tokamak Experimental Fusion Reactor.
Feb 79, 176p
In Japanese.
U.S. Sales Only.

Safety analysis of the superconducting toroidal field magnet for a Tokamak experimental fusion reactor has been carried out. Works were accident classification, FMEA and FTA analyses, coil stability and quench behavior calculations, failure detection and coil protection system designs, structure analysis, fracture and fatigue studies, and earthquake response analysis. Accident analysis of cryostat and refrigeration system was also performed. The objective of this work is to reveal technological problems of the toroidal field magnet by safety analysis. (Atomindex citation 11:506699)

JAERI-M-8120 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Theory of High-beta Tokamaks. Stability of Ballooning Mode.
Masahiro Wakatani, Shogo Seki, and Akio Kitsunezaki. Feb 79, 28p
In Japanese.
U.S. Sales Only.

The theoretical researches on high beta tokamak are reviewed. The ballooning mode instability is thought to be the most serious problem for the high beta tokamaks, and the theoretical results on the ballooning mode instability are discussed in detail. The experimental results in high beta belt pinch devices are also discussed. (Atomindex citation 11:506757)

JAERI-M-8135 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Study on the Neutron Transport Code Systems for Fusion Reactor Design.
M. Ebisuya, A. Takahashi, J. Yamamoto, H. Maekawa, and Y. Seki. Mar 79, 82p
In Japanese.
U.S. Sales Only.

Validity of the neutron transport code system (ENDF/B-IV, SUPERTOG, and ANISN) for D-T fusion reactor design was studied by comparison between the experimental and the calculated angular neutron spectra. The usual code system was found to have two drawbacks; i.e. the introduction of negative or oscillatory angular fluxes due to the finite Legendre polynomial expansion of scattering kernels, and inadequacy of the process to treat anisotropic nonelastic scattering. To cope with these two difficulties, a new method was developed in Osaka University, which is based on the transport equation with anisotropic collision source terms for elastic and inelastic scatterings expressed with a single analytic function, without any polynomials. Angular spectral analyses for blanket material systems (Li, C, Fe, etc.), by this new method show remarkable improvements in solving the above two problems. On the basis of this method, the neutronics code systems are improved greatly. (Atomindex citation 11:506675)

JAERI-M-8151 PC **A07**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Experimental Studies on an Axisymmetric Divertor in DIVA(JFT-2A).
Shin Yamamoto. Mar 79, 129p
In Japanese.
U.S. Sales Only.

DIVA(JFT-2a) is the first tokamak with an axisymmetric divertor in the world. Objectives of the experiments were i) Plasma production and confinement in a tokamak with a separatrix magnetic surface, and ii) divertor effects on radiation loss and plasma confinement. The results so far are as follows: i) The equilibrium with a separatrix magnetic surface is stable during the discharge. ii) There is an ergodic region near the separatrix magnetic surface due to non-axisymmetric magnetic perturbations. iii) The divertor reduces radiation loss and increases energy confinement time. iv) The divertor does not affect the transport process in the main plasma. (Atomindex citation 11:506761)

KEK-78-29 PC **A02**/MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Playing Catch with Energy Between Two Superconducting Coils.
Masayoshi Masuda, Takakazu Shintomi, and Kiyoyuki Asaji. Mar 79, 15p
U.S. Sales Only.

The first performance of playing catch with energy between two 100 kJ superconducting magnets has been presented. The mechanism of the energy transfer as an interface between the superconducting coils is a thyristorized DC-AC-DC converter. The obtained experimental efficiency of energy transfer has been compared with the theory and good agreement has been obtained. The method will offer a versatile extension of superconductive technique in energy problems. (Atomindex citation 11:506717)

KFK-2554 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Technische Physik.
Shape of Magnets in Toroidal Configurations.
H. Dustmann, J. Erb, H. Krauth, and W. Maurer. Jul 78, 27p
In German.
U.S. Sales Only.

A review of the calculations of the shape of toroidal magnets is given, when the coil is in pure tension, resp. free of bending moments. To calculate the optimum shape of the magnets a self consistent iteration process has been developed. This process needs as input data the coil number, the finite winding area, the winding number, the operating current and two geometric quantities, which are required according to the design. (Atomindex citation 10:422201)

KIYI-77-18 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Alpha -Particle Containment in Noncircular Section Tokamaks.
Ya. I. Kolesnichenko, and V. A. Yavorskii. 1977, 17p
In Russian.
U.S. Sales Only.

The containment problem of fast ions formed in a thermonuclear reaction of resulting from neutral injection is studied in noncircular section tokamaks. A method is developed for determination of number and space distribution of fast ions impinging the chamber walls of an axisymmetric tokamak with an arbitrary section form. Formulas giving the alpha -particle containment coefficient and their flux density to the chamber walls are obtained for elliptical section tokamaks. The comparative analysis of alpha -particle containment in tokamak with elliptical and circular sections is carried out. (Atomindex citation 10:434641)

KIYI-77-19 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Stable Non-Selfsustaining Thermonuclear Reaction in Tokamak-Reactor.
Ya. I. Kolesnichenko, and S. N. Reznik. 1977, 12p
In Russian.
U.S. Sales Only.

The possibility of a stable and energetically favourable induced thermonuclear burning in tokamaks at plasma temperature T approximately 10-20 keV is shown. The investigation is carried out considering the nonideality of alpha -particle confinement in plasma column. For description of transport processes in plasma neoclassical and empirical formulas are used. (Atomindex citation 10:434642)

KMSF-U-953 PC **A02**/MF **A01**
KMS Fusion, Inc., Ann Arbor, MI.
Interaction of Short Wavelength Laser Radiation with Spherical Shell Targets.
D. C. Slater, R. L. Berger, and G. E. Busch. 1980, 20p CONF-800707-14, IAEA-CN-38/I-3
Contract AC08-78DP40030
International conference on plasma physics and controlled nuclear fusion research, Brussels, Belgium, 1 Jul 1980.

Laser plasma interaction experiments have been performed at both 1.05 mu m and 0.53 mu m. Measurements of absorption and x-ray production from spherical shell targets have shown significant differences between the two laser wavelengths. The laser power on target up to 0.7-TW at 0.53 mu m was sufficient to observe effects from a high-temperature corona and confirmed the earlier predictions for wavelength scaling of the hot-electron temperature. (ERA citation 05:029977)

LBL-10914 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Heavy Ion Fusion Half-Year Report, October 1, 1979-March 31, 1980.
Mar 80, 40p
Contract W-7405-ENG-48

Major elements of the program in the first half of Fiscal Year 1980 included: (1) characterization of the 1 amp, 1 MV, 2 mu s beam after acceleration through one pulsed drift tube; (2) observation of current and energy spikes at the onset of the beam pulse occasioned by the unusually long transit-time (approx. 1 mu sec) of the mass 133 ions across the diode gap; (3) completion of the full system, comprising of source and three drift-tubes, in February 1980; (4) development of new beam diagnostic probes for high-intensity ion beams; and (5) a major re-direction of the design effort on the Induction Linac Test Bed to bring costs, based on R/D funds that include overhead, down from the 40 million system (described in LBL PUB-5031) to the canonical 25 million. (ERA citation 05:031389)

M-114(Ref.Manual) PC **A06**/MF **A01**
Lawrence Livermore National Lab., CA.
Shiva Oscillator Alignment System. Reference Manual.
J. Parker. 27 May 80, 104p
Contract W-7405-ENG-48

Shiva is a 20-arm Nd:glass laser used for inertial confinement fusion experiments. The broad range

of control, data acquisition, and analysis functions required to support the system has resulted in the implementation of a hierarchal computer network in which these functions have been divided into major subsystems: power conditioning, fusion target diagnostics, beam disgnostics, and alignment control. The alignment control subsystem includes pointing, centering, and focusing, as well as certain selection operations involving many hundreds of control points from the oscillators to the target. Alignment is accomplished with a chopped CW YAG laser directed from the oscillator through all 20 laser chains to a surrogate target. Sensors placed at strategic locations detect errors and provide feedback through the control system to motor driven gimbals. (ERA citation 05:029979)

NIIEFA-B-0236 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow.
Numerical Simulation of Plasma Equilibrium in a Tokamak in the Presense of a Ferromagnet.
E. N. Bondarchuk, N. I. Doinikov, and B. S. Mingalev. 1975, 17p
In Russian.
U.S. Sales Only.

In MHD approximation the numerical modeling equilibrium technique of the arbitrary cross-section quasistationary axial-symmetrical plasma at the ferromagnet presence is considered. Operating tokamak conditions modeling with different distribution j sub(psi) and initial ferromagnet magnetization is carried out. As a result the time dependences of current and voltage in the poloidal field system have been obtained. (Atomindex citation 10:422226)

NIIEFA-B-0341 PC **A03**/MF **A01**
Nauchno-Issledovatel'skii Inst. Elektrofizicheskoi Apparatury, Leningrad (USSR).
Calculation of Field and Force Topography of Toroidal Coils.
A. S. Simakov. 1977, 26p
In Russian.
U.S. Sales Only.

Calculation procedure of the stationary magnetic field in space and the volumetric forces, influencing the toroidal coil are considered. The calculation results of the different variants of the toroidal field coils of the designed "T-10M" and "T-20" devices, obtained by the computer program TOKAT are given. The analytical calculation of the nonmomentum coil configurations in the toroidal magnetic force field is carried out. (Atomindex citation 09:405890)

NIIEFA-B-0355 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow.
Electromagnetic Processes in the Circuit with Series-in-Turn Connection of Converters and Load Sections at Supply Voltage Inequality.
A. G. Roshal. 1977, 20p
In Russian.
U.S. Sales Only.

The electromagnet coil supply circuit on the series-in-turn connection principle of the power supplies and the load sections is considered. The analysis of the electromagnetic processes in this circuit is given for two cases: 1) the power supply voltage equality; 2) the asymmetry in the supply voltage system. The expressions are obtained to determine the over-voltage in the soil relative to earth and the current disbalance in the coil sections at emergency when inequality between voltages of the power supply system valve converters appears. The overvoltage dependence on the coil section number is considered. The experimental investigation results in the power supply system of the toroidal field coils in the "Tokamak-10" are given. (Atomindex citation 09:405871)

NIIEFA-B-0358 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow.
Analysis of Poloidal Field in the "T-10M" Device with Ferromagnetic Core and Internal Positioning of Control Winding.
E. N. Bondarchuk, and N. I. Doinikov. 1978, 18p
In Russian.
U.S. Sales Only.

Results of studies on finding the basic rules in the poloidal field magnetic system of the Tokamak-10M with central iron core and internal positioning of the control winding with respect to the toroidal field winding are given. Current and voltage dependences in inductor and control windings on their geometric positions, plasma filament shape and beta sub(l) (plasma pressure in relation to the pressure of electric current magnetic field) value are found. (Atomindex citation 09:405760)

NIIEFA-LM-0368 PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Elektrofizicheskoi Apparatury, Leningrad (USSR).
Effect of Support Number and Location on the Stressed State of a Circular Winding for a Toroidal Field in the Tokamak Type Device.
A. F. Arneman, Yu. V. Spirchenko, and R. V. Chvartatskii. 1978, 10p
In Russian.
U.S. Sales Only.

The stressed state of the toroidal field circular winding of the electromagnetic system of the tokamak-type devices with supports, providing reactions of tangential direction are investigated. The optimum support position is determined; the comparative analysis of the windings with one and two pairs of symmetrical point supports and the circular one, resting upon the central core is given. (Atomindex citation 09:405748)

NIIEFA-LM-0376 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow.
Study on the Strength of Toroidal Disk-Type Field Windings for Tokamak Devices by the Finite Element Method.
G. N. Sivkova, Yu. V. Spirchenko, and R. V. Chvartatskii. 1978, 12p
In Russian.
U.S. Sales Only.

The stress-strained state of toroidal disk-type field windings for tokamak devices is investigated on the basis of the plane problem solution of the elasticity theory by the finite element method (FEM). Using the numerical dimensions of the winding for the T-20 device the comparative analysis of the calculated results obtained by FEM with the results obtained by the construction mechanics is carried out. The comparison of the calculated results showed that the results are qualitatively identical. It indicates the wide possibilities of application of the rod theory methods for such problems in the estimated engineering calculations. However FEM permits to obtain a bidimensional strength field with an account of all the complicated circumstances (a disk cut, volume nonuniform loadings). In this case, for instance, the nonuniformly distributed contact pressure on the inductor is determined. It is important to know while working with it. The radial and tangential stresses are obtained. (Atomindex citation 10:431608)

NIIEFA-P-B-0421 PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Elektrofizicheskoi Apparatury, Leningrad (USSR).
To the Calculation of the Plasma MHD Equilibrium in a Tokamak.
S. N. Sadakov, and O. G. Filatov. 1979, 13p
In Russian.
U.S. Sales Only.

Suggested is a method of solving the problem of plasma MHD equilibrium in a tokamak. The problem is divided into two parts: internal and external one. The internal problem is solved to determine magnetic surfaces and the distribution of currents in the plasma. The solution of the external problem comes to determination of external conditions, needed for confinement of required equilibrium configuration. The solution of the internal problem is described in the form of nonclassical potentials for an area and a simple layer, located on the plasma boundary. The problem is solved numerically by an iterative technique. The solution of the external problem comes to the selection of outer discrete currents, providing the equilibrium. The selection of the currents is carried out by the method of least squarefits. The profiles of the current density in a tokamak, which were calculated as an example, coincide with the profiles, known from experiments. (Atomindex citation 11:506735)

ORNL/Sub-01517/16 PC **A03**/MF **A01**
Varian Associates, Palo Alto, CA. Palo Alto Microwave Tube Div.
Development Program for a 200 KW, CW, 28 GHz Gyroklystron. Quarterly Report No. 16, January-March 1980.
H. Jory, C. Conner, S. Evans, J. Moran, and W. Sayer. 1980, 38p
Contract W-7405-ENG-26

The objective of this program is to develop a microwave oscillator capable of producing 200 kW CW power output at 28 GHz. The use of the gyrotron or cyclotron resonance interaction is being pursued. During this reporting period the basic testing of axisymmetric tube 5R2 was completed. It successfully operated in excess of 200 kW both in pulse and CW modes. The measured power output of 212 kW establishes a new world record for CW power generation at 28 GHz. Further tests with various output guide components simulating the EBTS load were made. (ERA citation 05:031384)

ORNL/TM-7424 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
HIFI: A Computer Code for Projectile Fragmentation Accompanied by Incomplete Fusion.
J. R. Wu. Jul 80, 55p
Contract W-7405-ENG-26

A brief summary of a model proposed to describe projectile fragmentation accompanied by incomplete fusion and the instructions for the use of the computer code HIFI are given. The code HIFI calculates single inclusive spectra, coincident spectra and excitation functions resulting from particle-induced reactions. It is a multipurpose program which can calculate any type of coincident spectra as long as the reaction is assumed to take place in two steps. (ERA citation 05:029887)

PB80-851868 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
TOKAMAK Devices. September, 1978-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Sep 78-May 80,
Howard L. Ogushwitz. Jun 80, 166p
NERACIAANT1019
Supersedes PB80-813546. Sponsored in part by National Technical Information Service, Springfield, VA.

The citations describe the fusion reactor known as the TOKAMAK. Applications of TOKAMAK devices are also discussed. (Contains 200 citations.)

PB80-851876 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
TOKAMAK. February, 1979-June, 1980 (Citations from the NTIS Data Base).
Rept. for Feb 79-Jun 80,
Howard L. Ogushwitz. Jun 80, 199p
NERACUSGNT1019
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations describe the fusion reactor known as the TOKAMAK. Applications of TOKAMAK devices are also discussed. (Contains 198 citations.)

PB80-851884 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
TOKAMAK. June, 1979-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 79-May 80,
Howard L. Ogushwitz. Jun 80, 200p
NERACEDBNT1019
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations describe the fusion reactor known as the TOKAMAK. Applications of TOKAMAK devices are also discussed. (Contains 200 citations.)

PB80-851892 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
TOKAMAK. May, 1978-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for May 78-Jun 80,

Howard L. Ogushwitz. Jun 80, 204p NERACEI NT1019
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations describe the fusion reactor known as the TOKAMAK. Applications of TOKAMAK devices are also discussed. (Contains 200 citations.)

PB80-854409 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Coils. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 29p NERACUSGNT0797
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design and application of magnetic coils to such fields as plasma physics, fusion reactor design, and other experimental fusion systems. (Contains 049 citations.)

PB80-854417 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Coils. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
John H. Frey. Jun 80, 145p NERACIAANT0797
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design and application of magnetic coils to such fields as plasma physics, fusion reactor design, and other experimental fusion systems. (Contains 155 citations.)

PPPL-1638R PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Generalization of Connor and Hastie's Ripple-Trapping Coefficient, G(alpha).
R. J. Goldston, and H. H. Towner. Feb 80, 9p
Contract AC02-76CH03073

In their calculation of transport due to ripple trapping, Connor and Hastie employ a factor G(alpha) to take into account the poloidal variation of the depth and shape of the local magnetic wells. They assume, however, that the toroidal-field ripple strength, delta, is independent of the poloidal angle. This letter generalizes G to treat any arbitrary poloidal variation of delta, and also high-beta, non-circular plasma configurations of arbitrary aspect ratio. (ERA citation 05:029952)

PPPL-1665 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Internal Tilting Mode Stability of Non-Sperical Spheromak.
K. Yamazaki. Jun 80, 12p
Contract AC02-76CH03073

Fixed boundary tilting mode stability is analyzed for spheromak with arbitrarily shaped cross section. A prolate spheromak can be stabilized against tilting mode by adding a conducting shell of triangular or trapesoidal half-cross section. (ERA citation 05:029953)

PPPL-1668 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Impurity Control in TFTR.
J. L. Cecchi. Jun 80, 48p CONF-800455-16
Contract AM02-76CH03073
International conference on plasma surface interactions in controlled fusion devices, Garmisch, F.R. Germany, 21 Apr 1980.

The control of impurities in TFTR will be a particularly difficult problem due to the large energy and particle fluxes expected in the device. As part of the TFTR Flexibility Modification (TEM) project, a program has been implemented to address this problem. Transport code simulations are used to infer an impurity limit criterion as a function of the impurity atomic number. The configurational designs of the limiters and associated protective plates are discussed along with the consideration of thermal and mechanical loads due to normal plasma operation, neutral beams, and plasma disruptions. A summary is given of the materials-related research, which has been a collaborative effort involving groups at Argonne National Laboratory, Sandia Laboratories, and Princeton Plasma Physics Laboratory. Conceptual designs are shown for getterng systems capable of regenerating absorbed tritium. Research on this topic by groups at the previously mentioned laboratories and SAES Research Laboratory is reviewed. (ERA citation 05:029883)

PPPL-1669 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Forbidden Lines of Highly Ionized Ions for Localized Plasma Diagnostics.
E. Hinnov, R. Fonck, and S. Suckewer. Jun 80, 20p CONF-800320-4
Contract AM02-76CH03073
Topical conference on high temperature plasma diagnostics, Los Angeles, CA, USA, 17 Mar 1980.

Numerous optically forbidden lines resulting from magnetic dipole transitions in low-lying electron configurations of highly ionized Fe, Ti and Cr atoms have been identified in PLT and PDX tokamak discharges, and applied for localized diagnostics in the high-temperature (0.5 to 3.0 keV) interior of these plasmas. The measurements include determination of local ion densities and their variation in time, and of ion motions (ion temperature, plasma rotations) through Doppler effect of the lines. These forbidden lines are particularly appropriate for such measurements because under typical tokamak conditions their emissivities are quite high (10 exp 11 to 10 exp 14 photons/cm exp 3 - sec), and their relatively long wavelengths allow the use of intricate optical techniques and instrumentation. The spatial location of the emissivity is directly measurable, and tends to occur near radii where the ionization potential of the ion in question is equal to the local electron temperature. In future larger and presumably higher-temperature tokamaks analogous measurements with somewhat heavier atoms, particularly krypton, and perhaps zirconium appear both feasible and desirable. (ERA citation 05:029877)

Rijnhuizen-77-104 PC **A03**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
Energy Confinement in High-Density Tokamaks.
D. C. Schram, and F. C. Schueller. Sep 79, 43p
U.S. Sales Only.

Gas injection in tokamak discharges has made it possible to raise the electron density, nsub(e), to values well above 10 exp 20 m exp -3 . The most important phenomenon is that the energy confinement time, tausub(E), and the poloidal beta, beta sub(theta), increase roughly proportionally to the density, which indicates a change in the prevailing energy loss mechanisms. Rather than considering only the changes in tausub(E) or using elaborate numerical codes, a simple method to evaluate the confinement is introduced here. This method is based on the assumption that the experimental profiles can be approximated by gaussians. Analytic expressions for various plasma quantities as a function of the radius are given. The ohmic power input is compared with the power transported by ion heat conduction for a typical discharge in Alcator. This comparison shows that, within the radius of interest for confinement properties, the plateau-ion heat conduction is the major loss mechanism. (Atomindex citation 11:506739)

RL-78-095 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford Lab.
Dynamics of Laser Produced Implosion of Gas Filled Microballoon Targets.
R. G. Evans, M. H. Key, and D. J. Nicholas. 1978, 24p CONF-780811-37
Conference on plasma physics and control, Innsbruck, Austria, 23 Aug 1978.
U.S. Sales Only.

Laser produced compression of gas filled microballoon targets has been produced by a two beam Nd:glass laser with energies of up to 40 Joule per beam in a 100 psec pulse. The compressed plasma has been diagnosed by space resolved, time integrated X-ray spectroscopy and by observation of D-T fusion reaction products. Time resolved measurements of the implosion dynamics have been made by X-ray streak photography with a time resolution of 20 psec and in a separate experiment by pulsed X-ray shadowgraphy (or radiography) with a time resolution of 100 psec. Evidence is presented for hydrodynamic instability and shell break-up in an exploding pusher implosion of a layered microballon. A multi-layer plane target experiment has yielded a quantitative measurement of laser energy deposited into fast electrons. (Atomindex citation 10:431536)

RL-79-012 PC **A05**/MF **A01**
Science Research Council, Chilton (England). Rutherford Lab.
Rencontre on Fusion Technology.
S. F. J. Read. Feb 79, 75p
U.S. Sales Only.

This report of a rencontre held to consider the technology of magnetic confinement fusion devices gives the agenda for the meeting and lists those topics which were identified as areas of research. These topics included materials, tritium, structures and heat transfer, neutronics and nuclear data, and corrosion problems. (Atomindex citation 10:471709)

SAND-79-2341C PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Saturation and Isotopic Replacement of Deuterium in Low-Z Material.
B. L. Doyle, W. R. Wampler, D. K. Brice, and S. T. Picraux. 1980, 26p CONF-800455-5
Contract EY-76-C-04-0789
International conference on plasma surface interactions in controlled fusion devices, Garmisch, F.R. Germany, 21 Apr 1980.

The saturation and replacement of hydrogen isotopes implanted into TiC, TiB sub 2 , VB sub 2 , B sub 4 C, B, Si, and C has been examined experimentally and modeled theoretically. The deuterium saturation concentrations for these materials varied from .16 to .57. A new isotopic replacement model is presented which predicts isotopic trapping and exchange on the basis of the depth dependence of the implanted ions and the experimentally determined hydrogen saturation concentration. Our results indicate that, for these materials used as coatings on components in a D-T fueled tokamak, T recovery by ion induced replacement with H or D should be feasible and that T buildup will be at tolerable levels. (ERA citation 05:030015)

SAND-80-0461C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Preliminary PBFA II Design.
D. L. Johnson, J. P. VanDevender, and T. H. Martin. 1980, 6p CONF-800640-1
Contract AC04-76DP00789
14. pulse power modulator symposium, Orlando, FL, USA, 3 Jun 1980.

The upgrade of Sandia National Laboratories particle beam fusion accelerator, PBFA I, to PBFA II presents several interesting and challenging pulsed power design problems. PBFA II requires increasing the PBFA I output parameters from 2 MV, 30 TW, 1 MJ to 4 MV, 100 TW, 3.5 MJ with the constraint of using much of the same PBFA I hardware. The increased PBFA II output will be obtained by doubling the number of modules (from 36 to 72), increasing the primary energy storage (from 4 MJ to 15 MJ), lowering the pulse forming line (PFL) output impedance, and adding a voltage doubling network. (ERA citation 05:029982)

TRITA-PFU-79-07 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden).
Longitudinal Invariant Surfaces in Ring-Current Configurations.
J. Scheffel. Apr 79, 21p
U.S. Sales Only.

The influence of magnetically shielded supports on the particle motion in ring-current fusion devices has been investigated. For this purpose the longitudinal adiabatic invariant has been studied. The obtained results confirm earlier approximate deductions of the surfaces generated by the particle

drift motion across the magnetic field. It is shown that the disturbances of these surfaces by the support field can be kept small, by a proper choice of the system parameters. (Atomindex citation 11:509743)

UCID-18704 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Introduction to Magnetic Confinement Fusion Diagnostics.
W. C. Turner. 6 Jun 80, 47p
Contract W-7405-ENG-48

These notes present a brief survey of some of the current diagnostic techniques used in magnetic fusion plasma devices. To give an idea of the range of parameters and geometries encountered the parameters of four representative experiments - PLT, TMX, ZT-40 and EBT-I(S) - are given. The central issue of all experiments is to understand the flow of power which can be summarized by two volume integrated equations for the ions and electrons. (ERA citation 05:029878)

UCID-18707 PC **A10**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Laser Fusion Experiments at LLL.
H. G. Ahlstrom. 16 Jun 80, 225p
Contract W-7405-ENG-48

These notes present the experimental basis and status for laser fusion as developed at LLL. Two other chapters, one authored by K.A. Brueckner and the other by C. Max, present the theoretical implosion physics and laser plasma interaction physics. The notes consist of six sections. The first is an introductory section which provides some of the history of inertial fusion and a simple explanation of the concepts involved. The second section presents an extensive discussion of diagnostic instrumentation used in the LLL Laser Fusion Program. The third section is a presentation of laser facilities and capabilities at LLL. The purpose here is to define capability, not to derive how it was obtained. The fourth and fifth sections present the experimental data on laser-plasma interaction and implosion physics. The last chapter is a short projection of the future. (ERA citation 05:029986)

UCID-18716 PC **A02**/MF **A01**
KMS Fusion, Inc., Ann Arbor, MI.
Simple Spherical Ablative-Implosion Model.
F. J. Mayer, J. T. Steele, and J. T. Larsen. 23 Jun 80, 18p
Contract W-7405-ENG-48

A simple model of the ablative implosion of a high-aspect-ratio (shell radius to shell thickness ratio) spherical shell is described. The model is similar in spirit to Rosenbluth's snowplow model. The scaling of the implosion time was determined in terms of the ablation pressure and the shell parameters such as diameter, wall thickness, and shell density, and compared these to complete hydrodynamic code calculations. The energy transfer efficiency from ablation pressure to shell implosion kinetic energy was examined and found to be very efficient. It may be possible to attach a simple heat-transport calculation to our implosion model to describe the laser-driven ablation-implosion process. The model may be useful for determining other energy driven (e.g., ion beam) implosion scaling. (ERA citation 05:029987)

UCID-18719 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Preliminary Analysis of a Target Factory for Laser Fusion.
J. W. Sherohman, and C. D. Hendricks. 10 Jun 80, 17p
Contract W-7405-ENG-48

An analysis of a target factory leading to the determination of production expressions has provided for the basis of a parametric study. Parameters involving the input and output rate of a process system, processing yield factors, and multiple processing steps and production lines have been used to develop an understanding of their dependence on the rate of target injection for laser fusion. Preliminary results have indicated that a parametric study of this type will be important in the selection of processing methods to be used in the final production scheme of a target factory. (ERA citation 05:028550)

UCRL-50051-79-3 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Magnetic Fusion Energy Quarterly Report, July-September 1979.
J. R. Strack. 15 Feb 80, 98p
Contract W-7405-ENG-48

The three main sections of this report are Confinement Systems, Development and Technology, and Applied Plasma Physics. Each of these sections is introduced by an overall statement of the goals and purposes of the groups reporting in it. As appropriate within each section, statements of the goals of individual programs and projects are followed by articles containing summaries of significant recent activity and descriptive text. (ERA citation 05:031369)

UCRL-50051-79-4 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Magnetic Fusion Energy. Quarterly Report, October-December 1979.
M. A. Harrison, and C. K. McGregor. 15 Mar 80, 55p
Contract W-7405-ENG-48

The information in each Quarterly is presented in the same sequence as in the Field Work Package Proposal and Authorization System (WPAS) submissions prepared for the US Department of Energy; the three main sections are Confinement Systems, Development and Technology, and Applied Plasma Physics. Each of these sections is introduced by an overall statement of the goals and purposes of the groups reporting in it. As appropriate within each section, statements of the goals of individual programs and projects are followed by articles containing summaries of significant recent activity and descriptive text. A fourth section, The Open Systems Mirror Fusion Program, will be included as appropriate to report on LLL's function as lead laboratory for that program. (ERA citation 05:031370)

UCRL-83532 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
RF Magnetron Sputtering of Thick Platinum Coatings on Glass Microspheres.
S. F. Meyer, E. J. Hsieh, and R. J. Burt. 28 May 80, 14p CONF-800439-9
Contract W-7405-ENG-48
International conference on metallurgical coatings, San Diego, CA, USA, 21 Apr 1980.

Thick platinum coatings on glass microspheres are needed for proposed Laser Fusion targets. The spherical nature of these substrates coupled with the small dimensions (approx. 100 mu m OD) make it difficult to achieve a smooth and uniform coating. Coating problems encountered include a rough surface and porous microstructure from the oblique incidence and lack of temperature and bias control, clumping of the microspheres causing non-uniformities, and particle accumulation causing cone defects. Sputtering parameters significantly affecting the coatings include total pressure, DC substrate bias, and the addition of doping gases. Using an ultrasonic vibrating screened cage and RF magnetron Sputtergun, we have successfully batch coated microspheres with up to 6 mu m of Pt, with a surface roughness of 200 nm, thickness non-concentricity of 300 nm, and density greater than 98% of bulk Pt. (ERA citation 05:028551)

UCRL-83981 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Electrostatic Levitation and Transport of Laser Fusion Targets.
W. L. Johnson, and C. D. Hendricks. 22 May 80, 6p CONF-800914-2
Contract W-7405-ENG-48
IEEE meeting, Cincinnati, OH, USA, 29 Sep 1980.

Several levitation concepts have been evaluated resulting in the electrostatic quadrupole being chosen as the most universal. A levitator has been constructed to handle laser fusion targets during and between the processing steps. The levitator is based on a quadrupole rail which is segmented to provide electrically controlled transport and confinement along the rail. This device has demonstrated transport both vertical and horizontal of targets with appropriate mass to size ratios and exhibits remarkably stable confinement at atmospheric pressure. (ERA citation 05:029989)

18B. Isotopes

JEN-430 PC **A09**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Generator exp 113 Sn-Sup(113M)In. Study of the Most Important Characteristics in the Eluate Composition for the Preparation of Clinical Labelled Compounds.
L. Adan, and D. V. Rebollo. 1978, 184p
In Spanish.
U.S. Sales Only.

The design for the construction of a generator exp 113 Sn-sup(113m)In is described. A systematic assay for the adequate adsorbents has been made, to obtain solutions of high radiochemical purity, as it is required for the radiopharmaceutical preparations. The control of purity is carried on by qualitative and quantitative analysis of the solutions, complemented by radiochemical techniques. The following physico-chemical parameters have been determinated; consecutive equilibrium constants, pH, distribution constants, separation factors and electrophoretic factors. It has been considered the measure of these parameters for the best quality in the preparation of the radiopharmaceutical compounds. (Atomindex citation 10:451524)

LA-8372-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Exp 242 Pu Isotopic Verification.
T. E. Sampson, S. Johnson, and K. Kroncke. May 80, 19p
Contract W-7405-ENG-36

This document reports on measurement methods being developed and implemented to verify nondestructively the isotopic composition of certain batches of plutonium highly enriched in exp 242 Pu. High-resolution gamma-ray spectroscopy techniques are used to measure the isotopic ratios of exp 238 Pu/ exp 241 Pu and exp 239 Pu/ exp 241 Pu, which are minor constituents of the enriched exp 242 Pu. These ratios uniquely verify the specific batch of exp 242 Pu and can indicate with high sensitivity if the exp 242 Pu has been contaminated with plutonium of the other isotopic compositions. Data are presented that illustrate the successful application of these techniques to samples of arbitrary geometry ranging in mass from approx. 0.1 g to > 2 kg. (ERA citation 05:030963)

18C. Nuclear Explosions

AD-A087 998/1 PC **A03**/MF **A01**
SRI International Menlo Park CA
MISERS BLUFF Electromagnetic Propagation Experiments. Volume III-Preliminary Results of the UHF-EHF Radar-Scattering and Coherent-Transmission Experiments.
Topical rept. 1 Oct 78-31 Mar 79,
Alan A. Burns. 1 Oct 79, 41p DNA-4806T-3, AD-E300 858
Contracts DNA001-77-C-0269, DNA001-79-C-0181

SRI International fielded four electromagnetic propagation experiments during the MISERS BLUFF II high explosive tests. Two of the four experiments are discussed here, selected preliminary results are presented, and some tentative conclusions drawn. The UHF-EHF Coherent-Transmission Experiment measured the amplitude and phase changes suffered by a number of

phase-coherent CW signals transmitted through a volume of space above ground zero. The signals experienced phase retardations and absorption due to the mass of soil injected into the signal paths, and further extinction due to scattering loss from the dust particles. Diffractive and refractive propagation effects also occurred. The SHF-EHF-Scattering Experiment used a four-frequency radar system to measure backscatter from and transmission losses through the dust clouds in the 10-GHz to 100-GHz range. Radar effects of dust clouds were measured, and data were collected from which dust densities and particle-size distributions can be inferred. A great deal of internal structure was evident in the MBII-2 dust cloud. (Author)

AD-A088 362/9 PC **A05**/MF **A01**
TRW Defense and Space Systems Group Redondo Beach CA
Nuclear Hardness Evaluation Procedures for the Preliminary Assessment of the FLEETSATCOM Attitude and Velocity Control Subsystem.
Final rept. 1 Jan-1 Dec 79,
D. M. Clement, A. R. Carlson, and W. H. Rowan. 1 Dec 79, 87p DNA-5114F, AD-E300 871
Contract DNA001-78-C-0306

This document presents assessment procedures for the preliminary assessment of the survivability of the FLTSATCOM satellite Attitude and Velocity Control Subsystem (AVCS) to various nuclear weapon effects (NWE). In addition to obtaining the assessment results themselves the objectives of this assessment are primarily to exercise for the first time the NHEP (Nuclear Hardness Evaluation Procedures) assessment methodology for satellites on a real piece of satellite equipment and to identify technology and/or data gaps that hinder the assessment.

AD-A088 368/6 PC **A10**/MF **A01**
Physics International Co San Leandro CA
High Explosive Simulation of a Nuclear Surface Burst. A Feasibility Study.
Final rept. 1 Mar 77-30 Jun 79,
J. M. Thomsen, R. H. Franzen, and D. L. Orphal. 30 Jun 79, 205p PIFR-1035, DNA-5016F, AD-E300 884
Contract DNA001-77-C-0150

The feasibility of designing and constructing a high explosive source which faithfully reproduces the direct- and airblast-induced ground motions resulting from a 1-kt nuclear surface burst has been investigated. A preliminary charge design incorporating subsurface and surface high explosive charges was developed, and shown to theoretically reproduce the desired simulation conditions. The subsurface charge employs techniques first used in the MINE THROW I simulation of the JOHNIE BOY nuclear event. The surface charge consists of an elevated disc of explosive (ANFO) with a thickness varying from 1 m to 0.1 m with a total diameter of about 40 m. Detonation spacings and an initiation system for this novel charge design were investigated. A complete fieldable charge was not constructed because of difficulties in experimentally determining the detonation properties of thin sheets of ANFO. Steps leading to a future fieldable charge which simulate airblast, ground motion, and cratering effects of a 1-kt nuclear surface burst are made, based on results of this initial effort. (Author)

AD-A088 508/7 PC **A04**/MF **A01**
Technology International Corp Bedford MA
Optical Measurements of Miser's Bluff Multiburst Cloud Phenomenology.
Topical rept. 1 Oct 78-1 Oct 79,
W. P. Boquist, and R. W. Deuel. 1 Oct 79, 69p TIC-804, DNA-5192T, AD-E300 873
Contract DNA001-79-C-0032

Photographic measurements of a 120 ton single burst event and a 720 ton multiburst event were made as part of DNA Project MISER'S BLUFF in June and August 1978 at Planet Ranch, Arizona. This report incorporates a pictorial history of the two resulting dust clouds together with triangulated data plots of the cloud track, rise history, cloud width, and stem characteristics. (Author)

AD-A088 510/3 PC **A12**/MF **A01**
Civil Systems Inc Albuquerque NM
Misers Bluff Phase I Ground Shock Analysis of the Multiple Burst Experiments.
Interim rept. 1 Jan-1 Jun 78,
James S. Phillips, and Jimmie L. Bratton. 15 Aug 78, 260p DNA-5089Z, AD-E300 874
Contract DNA001-77-C-0301

The multiple burst experiments of Misers Bluff Phase I provided the data base for the evaluation of the superposition principle for ground motions. In addition, this data will be used in the development of a general prediction procedure for the multiple burst environment. Superposition of single burst waveforms is compared to the multiple burst waveforms on a component by component basis. Quantitative evaluation of these comparisons is made and presented for the three multiple burst experiments discussed in this report. In addition, state-of-the-art empirical predictions are compared in a like manner. Phenomenology associated with these experiments is discussed and related to the waveforms observed in the various experiments. The understanding of this phenomenology will aid in the development of the prediction procedure for the multiple burst environment. In addition, recommendations aimed at furthering the understanding of the multiple burst phenomenology are presented. (Author)

LA-UR-80-1107 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Characterization of Low-Loss Multimode Optical Fibers for Nuclear Diagnostics.
J. W. Ogle, M. A. Nelson, T. J. Davies, S. Lutz, and C. H. Lin. 1980, 18p CONF-800307-7
Contract W-7405-ENG-36
Fiber optic in the nuclear environment symposium, Adelphi, MD, USA, 25 Mar 1980.

The application of low loss multimode optical fibers to nuclear diagnostics has been discussed in previous papers. Fiber requirements for this application differ substantially from those for normal communications use. The emphasis for nuclear measurements has been on development of high frequency analog fiber optic transmission line systems, which range from 100 MHz to > 500 MHz signals transmitted at 600 nm and 800 nm, respectively. Accordingly, specialized fiber characterization procedures over a wide spectral range have been developed. These techniques include measurement of material and modal dispersion, optical attenuation, and optical linearity. It is also important to know the prompt radiation response of optical fibers in nuclear diagnostics. Measurements of this type have been discussed in previous papers. (ERA citation 05:029574)

18D. Nuclear Instrumentation

AGNS-35900-CONF-61 PC **A02**/MF **A01**
Allied-General Nuclear Services, Barnwell, SC.
On-Line Monitoring of Plutonium in Mixed Uranium-Plutonium Solutions.
K. J. Hofstetter, T. V. Rebagay, and G. A. Huff. Mar 80, 17p CONF-800433-7
Contract AC09-78ET35900
International conference on nuclear methods in environment and energy research, Columbia, MO, USA, 14 Apr 1980.

The measurement of the total and isotopic plutonium concentrations in mixed uranium-plutonium solutions blended with highly radioactive fission product nuclides and other radionuclides (e.g., Cs-137 and Co-60) has been investigated at the Barnwell Nuclear Fuel Plant (BNFP). An on-line total and isotopic plutonium monitoring system is being tested for its ability to assay the plutonium abundances in solutions as might be found in the process streams of a light water reactor (LWR) spent fuel processing plant. The monitoring system is fully automated and designed to be maintained remotely. It is capable of near real-time inventory of plutonium in process streams and provides the basis for on-line computerized accounting of special nuclear materials. (ERA citation 05:030327)

DESY-SR-79/23 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Experimental Setup for X-Ray Absorption Spectroscopy at the DESY.
P. Rabe, G. Tolkiehn, and A. Werner. Oct 79, 33p
U.S. Sales Only.

In this paper we describe an apparatus used at the Deutsches Elektronen-Synchrotron (DESY) for the measurement of x-ray absorption spectra, specially designed for the investigation of the extended x-ray absorption fine structure (EXAFS). Performance of the setup is discussed and compared with an apparatus using the bremsstrahlung of a conventional x-ray source. (Atomindex citation 11:509258)

EFI-341(66)-78 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Experimental Setup for Investigation of Photoproduction Reaction on Hydrogen and Nuclei.
R. O. Avakyan, Eh. O. Avakyan, and A. Eh. Avetisyan. 1979, 12p
In Russian.
U.S. Sales Only.

The description of the experimental setup for investigation of photoproduction reactions on hydrogen and nuclei is given. The setup consists of a total-absorption spectrometer on the basis of NaI(Tl) crystals and of a spectrometer being made of 30 narrow-gap spark wire chambers. The first spectrometer registers gamma quanta produced by the pi exp 0 (eta exp 0) meson decay and the second one registers protons in the energy range of 60-300 MeV. The energy dependences of the reaction cross section asymmetry were measured for the gamma p implies pi exp 0 p reaction at pion angles THETAsub(gamma pi)=40 deg, 50 deg in the C-system and for the gamma C exp 12 implies pi exp 0 px reaction at THETAsub(gamma pi)=50 deg and Esub(gamma)=(0.7+1.1)GeV. (Atomindex citation 11:509174)

FRNC-TH-690 PC **A05**/MF **A01**
Lyon-1 Univ. (France).
Bone Densitometry by gamma Ray Attenuation Measurement. Development of an Apparatus for Use on Medullary Casualties.
E. J. J. Berard. 1975, 96p
In French.Thesis.
U.S. Sales Only.

We proposed to follow changes in the bone mineral content of medullary damage cases by measuring the attenuation of a monoenergetic gamma ray according to the Cameron and Sorenson technique. Apart from their high cost, existing instruments are not designed for this bedside observation of patients. Our aim was therefore to design and develop an easily portable, inexpensive apparatus. The gamma radiation is supplied by a sealed exp 125 I source fitted with a narrow collimator. The battery-operated scintillation detector is that used to detect post-operative phlebites after injection of radio-fibrinogen. The source-detector unit can move to allow a transverse bone mineral content measurement. Data from the detector are processed electronically and the results, given - either graphically on a tracing board which gives an area proportional to the bone mineral content, or numerically by means of an integrator computing this area and supplying the linear bone density directly. Experiments carried cut in vivo showed the apparatus to be sensitive and the measurements, reproducible, the results obtained being comparable with those of other authors. By using pieces of embalmed bone, moreover, an excellent correlation was observed between the bone mineral content obtained after incineration and the results displayed by our apparatus, which can therefore be calibrated. (Atomindex citation 11:509177)

FRNC-TH-960 PC **A07**/MF **A01**
Grenoble-1 Univ. (France).
Cadmium Filtered Neutron Flux Determination. Comparison of Activation Methods.
M. Ollui-Mboulou. 1979, 131p
In French.Thesis.
U.S. Sales Only.

Neutron fluxes under cadmium filters are determined by the cadmium ratio and sandwich activation methods. The thermal neutron flux levels obtained with 7 detectors of different kinds: In, Au, Ag, W, Co, Mn, Zn are compared. The cadmium

ratio method was used in locations for which the epithermal and thermal neutron flux ratio are quite different. By irradiating materials under different thicknesses of cadmium it was possible to establish experimental curves from which the flux depression factors for intermediate neutrons may be determined whatever the thickness of the filter used. Whereas the cadmium ratio method can only measure the mean flux above the cadmium cut-off energy the sandwich method enables the flux value to be determined in a narrow band around the resonance energy of each detector used. (Atomindex citation 11:509226)

GSF-S-587 PC **A04**/MF **A01**
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Strahlenschutz.
GSF Secondary Standard Laboratory for Photon and beta Radiation.
H. Eckerl, and U. Nahrstedt. Apr 79, 71p
In German.
U.S. Sales Only.

The tasks of the laboratory are outlined and its rooms and apparatuses described. (Atomindex citation 11:509189)

IEA-DT-127 PC **A05**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Installation and Development of Neutron Radiography in the Nuclear Reactor (IEAR-1) of the Instituto de Energia Atomica, Brazil.
Tese (M.Sc.),
R. Fuga. Feb 79, 83p
In Portuguese.
U.S. Sales Only.

Investigations on the field of neutron radiography have been performed at the IEAR-1 swimming pool reactor utilizing a collimated neutron beam and the so-called photographic transfer method as a mean of detection. The test object (sample) is placed between the neutron source (reactor core) and the gold foil. The acitivity of its different points is the inverse measure of the neutrons absorbed in the test sample at the corresponding points. The activity distribution on the gold foil is determined again by exposing it to an X-ray film. A multichannel type collimator consisting of an assemblage of stainless steel tubes inside an aluminium mantle (tube) was used as a direction beam selector. (Atomindex citation 11:497166)

INS-TH-119 PC **A02**/MF **A01**
Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study.
Simultaneous Measurement of Intensity and Maximum Energy of Bremsstrahlung Photon Beam.
K. Gomi, and K. Ukai. Jan 79, 14p
In Japanese.
U.S. Sales Only.

A new type ionization chamber has been constructed to measure an intensity and a maximum energy of a bremsstrahlung photon beam simultaneously. This chamber has many thin copper plates to produce an electron photon cascade shower by an incident photon beam and to collect an ionization current of the shower particle. The characteristics of this chamber are studied using the beam from the 1.3 GeV electron synchrotron at INS, University of Tokyo. The results are good agreement with the shower theory. (Atomindex citation 11:509197)

JAERI-M-8165 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Improvement of Digital Data Acquisition System in Reflood Test Rig.
T. Sudoh, Y. Murao, and Y. Niitsuma. Mar 79, 31p
In Japanese.
U.S. Sales Only.

The original master digital data acquisition system was designed to collect 30 channels of analog data rapidly and convert them into digital form for recording on a magnetic tape. Due to the increases in the number of channels and the ranges of measurement, an additional acquisition device was needed for the original system. This report describes the design of the additional data acquisition device and the results of performance tests. The operational manual is attached as an appendix. It was confirmed that the new system satisfied the requirements of system. (Atomindex citation 11:497257)

JAERI-M-8196 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Precision Measurements of gamma-Ray Intensities.
Y. Yoshizawa, T. Katoh, Y. Iwata, T. Kaku, and Y. Iinuma. May 79, 79p
In Japanese.
U.S. Sales Only.

To determine relative intensities of gamma rays in the region of 280 to 2750 keV, Ge(Li) detectors were calibrated with standard sources and cascade gamma-ray sources. Decay rates of the standard sources were determined by means of the 4 pi beta - gamma or 4 pi X- gamma coincidence method. Experimental conditions were improved and spectra were carefully analyzed. Relative gamma-ray intensities of exp 56 Co, exp 88 Y, sup(110m)Ag, exp 133 Ba, exp 134 Cs, exp 152 Eu, exp 154 Eu, exp 192 Ir and exp 207 Bi were determined within the accuracy of about 0.5% for strong gamma rays. Intensities per decays were obtained from the relative intensities for most of the nuclides. (Atomindex citation 11:509243)

JINR-R-10-12327 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Algorithms for Testing Event Masks. 2. Pt. Using the TRACK-MATCH Procedure.
S. A. Baginyan, L. B. Bubeleva, V. I. Moroz, and L. B. Popkova. 1979, 16p
In Russian.
U.S. Sales Only.

The efficiency of the HPD system depends on the event mask quality. The elimination of event masks with errors before measurements using the HPD will provide a more effective operation of the system. The algorithms of the BERD program is described. It is intended for control measurements of masks of events registered in bubble chamber and in other track chambers. For the analysis of event mask the BERD program uses the TRACK-MATCH procedure. The mask of event is considered as measured correctly, if tracks reconstructed in the chamber space comply with corresponding tests. The BERD program is written in the FORTRAN-63 language for CDC-1604A computer and occupies 9695 words. (Atomindex citation 11:509175)

JINR-R-13-11227 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods.
CAMAC Controllable Nanosecond Delay Unit.
D. Lemann, G. Myuller, and G. Shchornak. 1978, 8p
In Russian.
U.S. Sales Only.

A CAMAC delay unit is described. Its most important parameters are: delay range 40-500 ns, temperature coefficient < +0.01%/deg C between 0 deg and 50 deg C, jitter approximately 2x10 exp -4 . The possibility of on-line measurement of the actual time delay with an error less than +-100 ps is provided. (Atomindex citation 10:421574)

JINR-R-13-12334 PC **A04**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Fast Unit System with Extended Functional Possibilities.
V. F. Boretko, Yu. G. Budyashov, Yu. M. Valuev, V. M. Grebenyuk, and V. G. Zinov. 1979, 56p
In Russian.
U.S. Sales Only.

A unified nuclear electronic unit system for the scintillation and Cherenkov counters is described. It consists of unxts for preliminary data processing from counters, logic units and special units. Frequency response of these units is (90-50) MHz depending upon their purpose. (Atomindex citation 11:509180)

JINR-R-15-12370 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Arrangement for Measurement of Kinetic Characteristics of Fission Fragments on alpha Particle Beam.
Yu. Ts. Oganesyan, D. D. Bogdanov, V. M. Vas'ko, G. I. Koval, and G. S. Popeko. 1979, 11p
In Russian.
U.S. Sales Only.

The design and electronic equipment of an arrangement for measuring the total kinetic energy (TKE) of rare event fragments of induced fission of nuclei by charged particles are described. Ionization chambers with plane-parallel electrodes are used as fission fragment detectors. The chambers operate in the mode of compensation of long-range background particles. The arrangement was tested on an alpha -particle beam. The detection efficiency for coincident fragments is 13.5%. The arrangement allows one to work with alpha -particle beams with an intensity of 0.2 mu A. At such currents the half-width of the TKE spectrum for the exp 238 U fission fragments by alpha -particles is 35 MeV, the relative sensitivity being about 10 exp -10 atom/atom. The arrangement may used to search superheavy elements with absolute content >= 2x10 exp 7 atoms. Factors limiting the arrangement sensitivity are discussed. (Atomindex citation 11:509225)

JINR-1-12356 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Optical Constant Determination of the LUDMILA Bubble Chamber.
A. Valkarova, R. Lednicky, and V. I. Molostvova. 1979, 13p
In Russian.
U.S. Sales Only.

Optical constant determining the LUDMILA bubble chamber necessary for operation of MDTHRESH and HYDRA programs of geometrical event reconstruction is described. Optical constant values obtained by the exposition of the chamber in the antiproton beam with the momentum of 22.4 GeV/c are discussed. The results of repeat constant determining point to the appearance of nonlinear deformation of the film during its processing. (Atomindex citation 11:509240)

JINR-1-12424 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Some Methodical Problems of Processing Events Produced by p, D, He, C Relativistic Nuclei in a Propane Bubble Chamber.
N. Angelov, N. Akhababyan, and Ts. Baatar. 1979, 20p
In Russian.
U.S. Sales Only.

Some methodical problems have been studied on the characteristics of the primary beams of relativistic nuclei, which the 2 m propane bubble chamber was exposed to. The problems were also investigated concerning the choice of the fiducial volume for stars, the scanning efficiency for the events produced in the tantalum plates inside the chamber and the precision of reconstruction of the space coordinates and parameters of secondary particles. The mean values of the momenta of p, d, He and C primary nuclei are determined. It is shown that the contamination of "nonbeam" particles does not exceed (1-3)% of beam particles. The contamination of events produced in propane is (12+-2)% of the events produced in tantalum at their visual selection. Described is a method of reconstruction of the production vertex in a tantalum plate by the continuation of the tracks of secondary particles and the criteria of visual identification of secondaries by the ionization density and by the number of delta-electrons on the tracks. It is shown that the root-meansquare deviation for the momenta of secondary particles is equal to 12%. (Atomindex citation 11:509168)

JINR-10-10843 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.

EPOS Program for gamma Spectra Processing of Semiconductor Detectors. Part I. The BESM-6 Program.
G. V. Vinel, V. M. Tsupko-Sitnikov, and G. Ehler. 1977, 23p
In Russian.
U.S. Sales Only.

An automatic spectrum processing program (EPOS) is described, and results of its employment are presented. The basis of the program is the method of statistical fitting to minimize the X exp 2 function. Processing time of the BESM-6 computer is 0.6 s per one peak while processing gamma spectra. The program is written in ALGOL. Comparison is made of the program with that based on a preliminary examination with initial approximations assumed by an investigator and consequent fitting of the model parameters by conventional methods. The processing of highly complicated spectra (200-250 photopeaks for 4096 channels) has shown that the results coincide for 85-90% of spectrum lines. (Atomindex citation 10:421694)

JINR-10-11124 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
ES 1010 Software for Testing CAMAC Modules.
V. G. Ableev, S. G. Basiladze, S. A. Zaporozhets, N. M. Piskunov, and V. D. Ryabtsov. 1977, 13p
In Russian.
U.S. Sales Only.

Test programs for digital and analog-digital CAMAC modules applied in physical experiments are described. Algorithms were written in FORTRAN-4 language for testing, data acquisition, processing and data control. ASSEMBLER ES 1010 subroutines were used for data acquisition and CAMAC module control. This allowed one to take advantages of a high level language for data processing and display, as well as for achieving an interface with the CAMAC hardware. Software applied enables one to improve considerably adjustment of CAMAC modules and to obtain their operational characteristics. (Atomindex citation 10:421682)

JINR-10-11448 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Results of Investigation of Operation Mode of Programs for Film Information Processing on the CDC-6500 Computer.
S. G. Badalyan, N. N. Govorun, V. B. Dubinchik, T. I. Zaboi, and V. G. Ivanov. 1978, 15p
In Russian.
U.S. Sales Only.

The experience with mass processing of results of measuring photographs from a heavy liquid bubble chambers on the CDC-6500 computer by a special system of programs indicates that at reading data from the input magnetic tape and recording results on the output magnetic tape there is a significant waste of of computer time owing to failures in tape recorder operation because of bad quality of magnetic tapes. Moreover, due to big expence of penpheral processor time required for operation with magnetic tapes the efficiency of central processors applying dereases. Different modes of operation of programs for film information processing with different types of devices for reading an input data and those for recording results are investigated. It is shown that the most reasonable operation mode for programs of film information processing on the CDC-6500 computer providing their reliable operation and effective use of a computer is that when information from magnetic tapes is copied on a magnetic disk and all further operations are made with files on this disk. On a final stage of information processing the results necessary to keep are copied again from a disk onto a magnetic tape. (Atomindex citation 09:415100)

JINR-13-10931 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
NG-3 Goniometer for Neutron Diffractometry with Control Computer.
C. Simane, K. Ondreicka, and V. Sulc. 1977, 32p
In Russian.
U.S. Sales Only.

The design of a triaxial neutron goniometer with the division of the total angle into 256 (2 exp 8) binary degrees (1 b.d.=1.40625 deg) is described. The rotation by an integer number of degrees is measured by means of a precise face gear clutch, and the rotation within the limits of one degree - by means of a micrometer screw. The electron scheme of control and connection of the goniometer for the single coaxial line with the controlling module in the CAMAC system is also described. The number of complete rotations around the axes is not limited. The minimum spacing is equal to 0.01+-0.002, the integral accuracy in the angle adjustment is +-0.005 b.d. The rotation rates are equal approximately to 6 and 0.06 b.d./sec. (Atomindex citation 10:421575)

JINR-13-12421 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Automatic Control System for Operating Parameters of the "Lyudmila" Hydrogen Bubble Chamber.
V. I. Kireev, V. T. Tolmachev, and Yu. V. Khrenov. 1979, 12p
In Russian.
U.S. Sales Only.

A bubble chamber is investigated as an object of control over temperature and pressure of a working liquid. Its dynamical characteristics are obtained for different channels of control. Controliers and their wiring diagrams for different control channels taking into account necessary control precision have been selected. Practical recommendations on adjustment and control for both separate units and the system as a whole are given. (Atomindex citation 11:509211)

JINR-13-12458 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
High-Illumination alpha -Spectrometer with High Focal Ratio for Investigations in Pulsed Radiation Fields.
J. Andrzejewski, 1979, 11p
In Russian.
U.S. Sales Only.

An improved high-illumination alpha -spectrometer for (n, alpha) investigations is described. Study of (n, alpha) reaction being continued required to increase further the sample area without violation of alpha -energy resolution and orload characteristics of the spectrometer. It was achieved by introducing a chamber of cylindrical geometry and collimation of the neutron beam in a form of a ring enclosing the sample and partly (approximately 15%) the working area of the chamber. The use of the described spectrometer in experiments on (n, alpha) and (n, gamma alpha) reactions with resonance neutrons as well as for the measurement of partial cross sections of (n, alpha) reaction in keV neutron energy region with the IBR-30 pulsed reactor proved it being preferable to the earlier employed spectrometers. (Atomindex citation 11:509167)

KFKI-1979-72 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Neutron Detection Efficiency of the 0.95 cm Thick NE-912 Lithium Glass.
V. N. Kononov, E. D. Poletaev, M. V. Bokhovko, L. E. Kazakov, and V. M. Timokhov. Oct 79, 16p
In Russian.
U.S. Sales Only.

The energy dependence of neutron detection efficiency of the 0.95 cm thick NE-912 lithium glass scintillator has been measured by time of flight method with IPPE pulsed Van de Graaff accelerator, using the efficiency of a 0.835 mm thin NE-908 exp 6 Li glass detector as a standard. The measurements have been carried out for two different types of mounting of the glass detector: I: the glass has been suspended perpendicular to the PM photocatode plane, II: the glass has been coupled directly to the photomultiplier. The energy ranges of the measurements in the mounting schemes I and II were 25 keV<Esub(n)<2 MeV and 25 keV<Esub(n)<1.2 MeV respectively. For the determination of the absolute efficiency the transmission of the thin glass detector in the resonance region has been measured. The measured efficiency curve showed the marked effect of the oxygen resonance at 442 keV. In addition it was found that in mounting scheme II also the photomultiplier window glass has an important influence on the neutron detection efficiency. (Atomindex citation 11:509213)

LA-UR-80-1209 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Tritium Monitoring System Using a Modified Kanne Chamber for Use in Tritium Contaminating Environments.
D. F. Anderson, and R. D. Hiebert. 1980, 13p CONF-800427-5
Contract W-7405-ENG-36
Tritium technology in fission, fusion, and isotopic applications, Dayton, OH, USA, 29 Apr 1980.

A Kanne chamber has been redesigned to reduce its sensitivity to such contaminants as tritium water vapor and tritiated oil. The high voltage electrode has been replaced by a wire cylinder and the collection electrode has been reduced in diameter. The sensitivity to contamination of the chamber has been reduced by about a factor of 40. The design allows for decontamination of the chamber in place. The improved electronics used is also discussed. (ERA citation 05:031089)

LA-UR-80-1361 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Repetitive MEGAMP Per Microsecond di/DT Pulsers for Driving sub-Ohm Transmission Line Neutrino Particle Detectors.
G. J. Krausse, 1980, 4p CONF-800640-4
Contract W-7405-ENG-36
14. pulse power modulator symposium, Orlando, FL, USA, 3 Jun 1980.

With the advent of low-cost honeycomb extrusions of polypropylene sheets, transmission line flash chambers have become highly attractive candidates for large particle detector arrays. This has brought about the need for repetitive pulse systems that must provide exceptionally high peak currents, low levels of spurious radiation, high reliability, and shot life in excess of 10 exp 7 . Each module of 10 flash chambers requires a peak current of 20 kA with a current di/dt greater than 1 MA/ mu s. The pulser output must develop approx. = 7 kV across a load of 0.5 omega with a pulse width of 500 ns. The complete system will require 40 pulsers run in parallel for a combined current output of 1.4 MA peak with a system di/dt of 40 MA/ mu s. The repetition rate will be up to 2 Hz. This paper describes the development of such a system, its unique voltage and current diagnostics, and the impact of the physical limitations of present component technology on lifetime, reliability, maintainability, and pulse fidelity. (ERA citation 05:029545)

LA-UR-80-1796 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Rapid Fuel Drawer Scanner for Fast Critical Assembly Safeguards.
J. C. Pratt, S. W. France, H. H. Hsu, J. T. Caldwell, and R. D. Hastings. 1980, 15p CONF-800655-8
Contract W-7405-ENG-36
21. annual meeting of the Institute of Nuclear Materials Management, Palm Beach, FL, USA, 30 Jun 1980.

An integrated scanning system incorporating highly efficient collimated neutron and high purity germanium gamma detectors with an on-line microprocessor has been developed to perform rapid inventorying of uranium and plutonium fuel drawers from fast critical assemblies. On-line least-squares fit procedures provide quantitative comparisons at a rate exceeding two drawers per minute. For plutonium-containing fuel, the neutron scan data can be related to the included exp 240 Pu isotopic mass; individual exp 239 Pu, exp 241 Pu, and exp 241 Am isotopic contents are obtained from simultaneous scans of the appropriate isolated gamma lines. (ERA citation 05:030334)

LPC-T-77-04 PC **A07**/MF **A01**
College de France, Paris. Lab. de Physique Corpusculaire.

Analysis of an Interaction Experiment of 12GeV/C of Antiprotons in Hydrogen in the Big European Bubble Chamber (B.E.B.C.). Study of the Problems Concerning the Efficiency of the Frame Automatic Measurement Apparatus (C.R.T.) Of This Chamber.
M. Obolensky. 1979, 145p
In French.Thesis.
U.S. Sales Only.

B.E.B.C. (Big European Bubble Chamber) filled with hydrogen is subjected to a 12 GeV/c beam of antiprotons. The frames are analyzed on a machine, called C.R.T. - Paris, using the light ray created on the screen of a Cathode Ray Tube. The topic of the study is the program, called 'tracking follower', which tries to ensure the most automatic pattern recognition of tracks of charged particles, by means of local approximation hypothesis (circle, parabola), having the constant possibility of calling the operator. We show that the accuracy of this measure on a semi-automatic machine is compatible with that of manual measurement tables, i.e. in the order of ten microns or less. Preliminary results, obtained for the first two hundred events analyzed on the C.R.T.-Paris, are presented at the end. (Atomindex citation 11:507272)

PAT-APPL-6-098 451 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Ionization Chamber.
Patent Application,
A. H. Walenta. Filed 29 Nov 79, 20p
Contract EY-76-C-02-0016
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An ionization chamber is described which has separate drift and detection regions electrically isolated from each other by a fine wire grid. A relatively weak electric field can be maintained in the drift region when the grid and another electrode in the chamber are connected to a high voltage source. A much stronger electric field can be provided in the detection region by connecting wire electrodes therein to another high voltage source. The detection region can thus be operated in a proportional mode when a suitable gas is contained in the chamber. High resolution output pulse waveforms are provided across a resistor connected to the detection region anode, after ionizing radiation enters the drift region and ionizes the gas. (ERA citation 05:032728)

PB80-851009 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Scintillation Detectors. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Aug 80, 163p
NERACIAANT0242
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the theory, application, and design of scintillation detectors. A description of the state-of-the-art devices currently in use is also included. (Contains 200 citations.)

PB80-851017 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Scintillation Detectors. March, 1972-May, 1980 (Citations from the NTIS Data Base).
Rept. for Mar 72-May 80,
Howard L. Ogushwitz. Aug 80, 206p
NERACUSGNT0242
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the theory, application, and design of scintillation detectors. A description of the state-of-the-art devices currently in use is also included. (Contains 200 citations.)

PB80-851025 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Scintillation Detectors. June, 1975-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 75-May 80,
Howard L. Ogushwitz. Aug 80, 200p
NERACEDBNT0242
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the theory, application, and design of scintillation detectors. A description of the state-of-the-art devices currently in use is also included. (Contains 200 citations.)

PB80-851033 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Scintillation Detectors. September, 1974-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Sep 74-Jun 80,
Howard L. Ogushwitz. Aug 80, 200p NERACEI NT0242
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the theory, application, and design of scintillation detectors. A description of the state-of-the-art devices currently in use is also included. (Contains 200 citations.)

18E. Nuclear Power Plants

CONF-800607-46 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Detection of Sensor Failures in Nuclear Plants Using Analytic Redundancy.
M. Kitamura. 1980, 9p
Contract W-7405-ENG-26
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

A method for on-line, nonperturbative detection and identification of sensor failures in nuclear power plants was studied to determine its feasibility. This method is called analytic redundancy, or functional redundancy. Sensor failure has traditionally been detected by comparing multiple signals from redundant sensors, such as in two-out-of-three logic. In analytic redundancy, with the help of an assumed model of the physical system, the signals from a set of sensors are processed to reproduce the signals from all system sensors. (ERA citation 05:029044)

DOE/ET/32052-T1 PC **A08**/MF **A01**
Nuclear Assurance Corp., Atlanta, GA.
International Data Collection and Analysis. Task 2.
J. B. Fox, J. J. Stobbs, D. M. Collier, and J. S. Hobbs. Apr 79, 153p
Contract AC01-77ET32052

Extensive data regarding the energy, electricity, and nuclear activities of 28 non-US countries are compiled in Task I. Task 2 summarizes that extensive data in 9 key facets and presents it in an item-by-item format. Comparisons are made between the 28 countries in these facets: projected energy growth; indigenous energy resources; nuclear market; nuclear fuel cycle; commercial nuclear international ties; government nuclear policy; vested nuclear interests; economic resources; and research and test reactors. Comparisons with US data are made in these areas: projected energy growth; indigenous uranium and thorium resources; nuclear fuel cycle; and fuel-cycle status. (ERA citation 05:030756)

DOE/ET/32052-T2(V.1) PC **A11**/MF **A01**
Nuclear Assurance Corp., Atlanta, GA.
International Data Collection and Analysis. Task 1.
J. B. Fox, J. J. Stobbs, D. M. Collier, and J. S. Hobbs. Apr 79, 250p
Contract AC01-77ET32052

Commercial nuclear power has grown to the point where 13 nations now operate commercial nuclear power plants. Another four countries should join this list before the end of 1980. In the Nonproliferation Alternative Systems Assessment Program (NASAP), the US DOE is evaluating a series of alternate possible power systems to determine practical nuclear systems which could reduce proliferation risk while still maintaining the benefits of nuclear power. Part of that effort is the development of a data base denoting the energy needs, resources, technical capabilities, commitment to nuclear power, and projected future trends for various non-US countries. The data are presented by country for each of 28 non-US countries. Within each country section, six major groups of data exist: projected energy demands, indigenous energy resources, and related information; nuclear history, capability, commitment, and trends; nuclear technology capabilities and resources not related to electric power production; economic resources available for nuclear power development; government commitment to nuclear power development and role in nuclear facilities construction and operation; and non-nuclear energy and fuel supply facilities. A collection of data on energy reserves, production, and consumption for the 28 countries from the widest possible range of sources is presented. This volume contains data on Argentina, Australia, Austria, Belgium, and Brazil. (ERA citation 05:030757)

DOE/ET/32052-T2(V.2) PC **A16**/MF **A01**
Nuclear Assurance Corp., Atlanta, GA.
International Data Collection and Analysis. Task 1.
J. B. Fox, J. J. Stobbs, D. M. Collier, and J. S. Hobbs. Apr 79, 356p
Contract AC01-77ET32052

Commercial nuclear power has grown to the point where 13 nations now operate commercial nuclear power plants. Another four countries should join this list before the end of 1980. In the Nonproliferation Alternative Systems Assessment Program (NASAP), the US DOE is evaluating a series of alternate possible power systems. The objective is to determine practical nuclear systems which could reduce proliferation risk while still maintaining the benefits of nuclear power. Part of that effort is the development of a data base denoting the energy needs, resources, technical capabilities, commitment to nuclear power, and projected future trends for various non-US countries. The data are presented by country for each of 28 non-US countries. Data are compiled in this volume on Canada, Egypt, Federal Republic of Germany, Finland, and France. (ERA citation 05:030758)

DOE/ET/32052-T2(V.3) PC **A13**/MF **A01**
Nuclear Assurance Corp., Atlanta, GA.
International Data Collection and Analysis. Task 1.
J. B. Fox, J. J. Stobbs, D. M. Collier, and J. S. Hobbs. Apr 79, 294p
Contract AC01-77ET32052

Commercial nuclear power has grown to the point where 13 nations now operate commercial nuclear power plants. Another four countries should join this list before the end of 1980. In the Nonproliferation Alternative Systems Assessment Program (NASAP), the US DOE is evaluating a series of alternate possible power systems. The objective is to determine practical nuclear systems which could reduce proliferation risk while still maintaining the benefits of nuclear power. Part of that effort is the development of a data base denoting the energy needs, resources, technical capabilities, commitment to nuclear power, and projected future trends for various non-US countries. The data are presented by country for each of 28 non-US countries. Data are compiled in this volume for India, Indonesia, Iran, Israel, Italy, and Japan. (ERA citation 05:030759)

DOE/ET/32052-T2(V.5) PC **A13**/MF **A01**
Nuclear Assurance Corp., Atlanta, GA.
International Data Collection and Analysis. Task 1.
J. B. Fox, J. J. Stobbs, D. M. Collier, and J. S. Hobbs. Apr 79, 290p
Contract AC01-77ET32052

Commercial nuclear power has grown to the point where 13 nations now operate commercial nuclear power plants. Another four countries should join this list before the end of 1980. In the Nonproliferation Alternative Systems Assessment Program

(NASAP), the US DOE is evaluating a series of alternate possible power systems. The objective is to determine practical nuclear systems which could reduce proliferation risk while still maintaining the benefits of nuclear power. Part of that effort is the development of a data base denoting the energy needs, resources, technical capabilities, commitment to nuclear power, and projected future trends for various non-US countries. The data are presented by country for each of 28 non-US countries. This volume contains compiled data on Sweden, Switzerland, Taiwan, United Kingdom, and Yugoslavia. (ERA citation 05:030760)

EGG-1183-1755 PC **A02**/MF **A01**
EG and G, Inc., Las Vegas, NV. Energy Measurements Group.
Aerial Radiological Survey of the Area Surrounding the Sequoyah Nuclear Power Plant, Daisy, Tennessee. Date of Survey: November 1977.
G. R. Shipman, T. J. Hendricks, and W. A. Frankhauser. Dec 79, 13p
Contract AC08-76NV01183

An airborne radiological survey of a 2000 km exp 2 area centered on the Sequoyah Nuclear Power Plant was conducted during the period November 7-11, 1977. With two exceptions, detected radioisotopes and their associated gamma ray exposure rates were consistent with those expected from the normal background emitters. Aerial average exposure rates, given in mu R/h at 1 m above the ground, are presented in the form of an isopleth map. Soil examples taken under selected flight lines showed reasonable agreement with the airborne data. (ERA citation 05:031132)

IAEA-R-2098-F PC **A09**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Source Modelling in Seismic Risk Analysis for Nuclear Power Plants. Final Report for the Period 1 December 1977 - 30 November 1978.
M. S. Yucemen. Dec 78, 185p
U.S. Sales Only.

The proposed probabilistic procedure provides a consistent method for the modelling, analysis and updating of uncertainties that are involved in the seismic risk analysis for nuclear power plants. The potential earthquake activity zones are idealized as point, line or area sources. For these seismic source types, expressions to evaluate their contribution to seismic risk are derived, considering all the possible site-source configurations. The seismic risk at a site is found to depend not only on the inherent randomness of the earthquake occurrences with respect to magnitude, time and space, but also on the uncertainties associated with the predicted values of the seismic and geometric parameters, as well as the uncertainty in the attenuation model. The uncertainty due to the attenuation equation is incorporated into the analysis through the use of random correction factors. The influence of the uncertainty resulting from the insufficient information on the seismic parameters and source geometry is introduced into the analysis by computing a mean risk curve averaged over the various alternative assumptions on the parameters and source geometry. Seismic risk analysis is carried for the city of Denizli, which is located in the seismically most active zone of Turkey. The second analysis is for Akkuyu. (Atomindex citation 11:508388)

INIS-mf-4615 PC **A02**/MF **A01**
Nuclear Insurance Consultants.
United States Nuclear Insurance Program: An Update of Recent Developments and Trends.
L. G. Cummings. 1978, 23p CONF-780584-20
International conference on regulating nuclear energy, Brussels, Belgium, 16 May 1978.
U.S. Sales Only.

There are numerous developments concerning nuclear insurance in the United States at present. The debate on the constitutionality of the Price-Anderson Act questions the principle of the limitation of the operators liability. The insurance market is undergoing changes with the reorganisation of the four main pools, NELIA (Nuclear Energy Liability Insurance Association), NEPIA (Nuclear Energy Property Insurance Association), MAELU (Mutual Atomic Energy Liability Underwriters), MAERP (Mutual Atomic Energy Reinsurance Pool). Insurance premiums for damage have been revised on several occasions following industrial demand and the development of the insurance market capacity. (Atomindex citation 10:431084)

INIS-mf-5562 PC **A02**/MF **A01**
Ente Nazionale per l'Energia Elettrica, Rome (Italy).
Legal Position of the Operator and the Constructor of a Nuclear Installation.
Claudio Sartorelli. 1976, 10p
In Italian.
U.S. Sales Only.

This Note analyses the procedures required in Italy for nuclear power plant construction and operation under Act No. 1860 of 31 December 1962 on the peaceful uses of nuclear energy and Presidential Decree No. 185 of 13 February 1964 on radiation protection, made under that Act; this latter Decree lays down the licensing system for nuclear power plants. The Note describes the standards for plant construction; the third party liability regime for nuclear damage; the step-by-step licensing procedure, siting; the supply of fuel elements and fuel loading; the protection of workers involved with ionizing radiation and finally the penal provisions in case of violation of the Act and Decree. (Atomindex citation 11:514680)

NUREG/CR-1282 PC **A06**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Statistical Analysis of Steam Generator Inspection Plans and Eddy Current Testing.
Technical rept.,
R. G. Easterling. Aug 80, 103p SAND-79-2300

Methods are given for choosing steam generator inspection plans which have specified statistical properties. The methods include adjustments for the possible effect of eddy current testing measurement error. Available measurement error data are analyzed and statistical methods are given for analyzing the results of in-service inspection of steam generators. To evaluate candidate inspection plans, a computer simulation is proposed and illustrated. Additionally, an exponential/double exponential probability model for the distributions of degradation and measurement error is developed and used in a parametric study of some statistical properties of inspection plans.

NUREG/CR-1505 PC **A07**/MF **A01**
Brookhaven National Lab., Upton, NY.
Advanced Reactor Safety Research Division.
Quarterly progress rept. 1 Jan-31 Mar 80,
Herbert J. C. Kouts, Walter Y. Kato, A. K. Agrawal, R. J. Cerbone, and C. Sastre. 1980, 141p BNL-NUREG-51217
Contract DE-AC02-76CH00016
See also report dated Mar 80, NUREG/CR-1402.

The Advanced Reactor Safety Research Programs Quarterly Progress Report describes current activities and technical progress in the programs at Brookhaven National Laboratory sponsored by the USNRC Division of Reactor Safety Research. The projects reported each quarter are the following: HTGR Safety Evaluation, SSC Code Development, LMFBR Safety Experiments, and Fast Reactor Safety Code Validation.

NUREG-0011-SUP-3 PC **A05**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Operation of Sequoyah Nuclear Plant, Units 1 and 2. Docket Nos. 50-327 and 50-328. Tennessee Valley Authority. Supplement No. 3.
Safety evaluation rept.
Sep 80, 98p
See also Supplement No. 2, dated Aug 80, NUREG-0011-SUP2.

Supplement No. 3 to the Safety Evaluation Report of Tennessee Valley Authority's application for licenses to operate its Sequoyah Nuclear Plant, Units 1 and 2, located in Hamilton County, Tennessee, has been prepared by the Office of Nuclear Reactor Regulation of the U.S. Nuclear Regulatory Commission. This supplement provides further information on the hydrogen control measures for Unit 1.

NUREG-0053-SUP-12 PC **A02**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Operation of North Anna Power Station, Unit 2, Virginia Electric and Power Company, Supplement No. 12. Docket No. 50-339.
Safety evaluation rept.
Aug 80, 12p
See also Supplement no. 11, NUREG-0053-SUP-11.

On June 4, 1976, the Nuclear Regulatory Commission issued its Safety Evaluation regarding the application for licenses to operate the North Anna Power Station, Units 1 & 2. The application was filed by Virginia Electric and Power Company. This Supplement, No. 12, addresses emergency preparedness.

NUREG-0685 PC **A04**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Standards Development.
Environmental Assessment for Effective Changes to 10 CFR Part 50 and Appendix E to 10 CFR Part 50; Emergency Planning Requirements for Nuclear Power Plants,
William R. Ott. Aug 80, 62p

The staff of the U.S. Nuclear Regulatory Commission has prepared an Environmental Assessment for changes to the regulations governing emergency planning requirements. Based on this assessment, the Director, Office of Standards Development determined that an Environmental Impact Statement would not be prepared for the rule changes and directed that a 'Negative Declaration; Finding of No Significant Impact' be prepared and published in the Federal Register.

RISO-M-2139 PC **A04**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Notes on Human Error Analysis and Prediction.
J. Rasmussen. Nov 78, 53p
U.S. Sales Only.

The notes comprise an introductory discussion of the role of human error analysis and prediction in industrial risk analysis. Following this introduction, different classes of human errors and role in industrial systems are mentioned. Problems related to the prediction of human behaviour in reliability and safety analysis are formulated and "criteria for analyzability" which must be met by industrial systems so that a systematic analysis can be performed are suggested. The appendices contain illustrative case stories and a review of human error reports for the task of equipment calibration and testing as found in the US Licensee Event Reports. (Atomindex citation 10:442214)

18F. Radiation Shielding and Protection

AECL-6479 PC **A05**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Properties of Collision Probability Integrals in Annular Geometry-II Evaluation.
M. S. Milgram, and K. N. Sly. Feb 79, 97p
U.S. Sales Only.

To calculate neutron flux distributions in infinitely long annular regions, the inner-outer and outer-outer transmission probabilities p/sup io/ and p/sup oo/ are required. Efficient algorithms for the computation of these probabilities as functions of two variables (the ratio of inner/outer radii kappa, and cross-section sigma) are given for 0 <= kappa <= 1 and all 0 < sigma , with fractional errors less than 2 x 10 exp -5 . (Atomindex citation 11:509982)

AGNS-35900-CONF-65 PC **A02**/MF **A01**
Allied-General Nuclear Services, Barnwell, SC.
Automated Calibrations and Dynamic Corrections for Differential Pressure Transmitters.
J. M. Crawford. Jun 80, 13p CONF-800655-19
Contract AC09-78ET35900
21. annual meeting of the Institute of Nuclear Materials Management, Palm Beach, FL, USA, 30 Jun 1980.

A large reprocessing plant is a complex operation with dynamic inventories being required to provide for timely detection of attempted diversion of nuclear materials. The real-time, on-line process measurement capability controls the effectiveness of the dynamic techniques. An economical method to eliminate bias and significantly improve process differential pressure transmitter measurements is evaluated. Errors up to 1.0% have been reduced to less than 0.1%. (ERA citation 05:028533)

AGNS-35900-CONF-67 PC **A02**/MF **A01**
Allied-General Nuclear Services, Barnwell, SC.
Advanced Access Control System.
L. D. Barnes, and R. W. King. Feb 80, 11p
CONF-800655-20
Contract AC09-78ET35900
21. annual meeting of the Institute of Nuclear Materials Management, Palm Beach, FL, USA, 30 Jun 1980.

A prototype voice verification system has been installed which provides the required positive identification at the main site access control point. This system compares an individual's file voice print with a sample voice print obtained from the individual when an attempt is made to enter the site. The voice system transmits the individual's identity to a central processor. The central processor associates that individual's authorization file with a card-key obtained at the access point. The system generates a record of personnel movement, provides a personnel inventory on a real-time basis, and it can retrieve a record of all prior events. The system installed at the Barnwell Nuclear Fuel Plant is described. (ERA citation 05:028534)

AGNS-35900-CONF-81 PC **A02**/MF **A01**
Allied-General Nuclear Services, Barnwell, SC.
Advanced Integrated Safeguards at Barnwell.
K. J. Bambas, and L. D. Barnes. Jun 80, 9p
CONF-800655-26
Contract AC09-78ET35900
21. annual meeting of the Institute of Nuclear Materials Management, Palm Beach, FL, USA, 30 Jun 1980.

The development and initial performance testing of an advanced integrated safeguards system at the Barnwell Nuclear Fuel Plant (BNFP) is described. The program concentrates on the integration and coordination of physical security and nuclear materials control and accounting at a single location. Hardware and software for this phase have been installed and are currently being evaluated. The AGNS/DOE program is now in its third year of development at the BNFP. (ERA citation 05:028535)

BNL-NCS-51152 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Evaluation of Natural Chromium Neutron Cross Sections for ENDF/B-V.
A. Prince, and T. W. Burrows. Feb 79, 92p
ENDF-286
Contract AC02-76CH00016

This report describes the evaluation of natural chromium for ENDF/B-V. Neutron cross sections and photon production are presented for the energy range 10 exp -5 eV to 20 MeV. An extreme effort was made to incorporate all available new experimental data since the previous ENDF/B-IV evaluation. Particular consideration was also given to consistency between calculation and experimental data and are described in detail. Covariance files are given and are based on model code uncertainties along with empirical data. (ERA citation 05:029828)

BNL-27566 PC **A02**/MF **A01**
Argonne National Lab., IL.
Studies of the Phase Transitions in UAs with Neutron Scattering.
S. K. Sinha, G. H. Lander, S. M. Shapiro, and O. Vogt. 1980, 9p CONF-800417-3
Contract AC02-76CH00016
European Physicists Society and Swiss National Science Foundation conference, Zurich, Switzerland, 9 Apr 1980.

Uranium arsenide is known to order with the type-I antiferromagnetic (AF) structure at approx. 126 K, and exhibit a first-order transition to the type-IA AF structure at T/sub N//2. We have now reexamined these transitions with a single crystal. Above T/sub N/ UAs exhibits critical scattering suggesting a tendency to order with an incommensurate wavevector, but then suddenly orders with the AF-I structure. The analysis of the data shows the need to consider anisotropic exchange interactions of cubic symmetry between U moments. (ERA citation 05:029827)

COO-2280-39 PC **A05**/MF **A01**
Northwestern Univ., Evanston, IL.
Boundary and Interface Function Method for One Dimensional Neutron Transport.
A. J. Antolak, and E. H. Bareiss. Nov 79, 100p
Contract AS02-76ER02280

A new numerical method, the Boundary and Interface Function (BIF) Method, for solving the one-dimensional neutron transport equation is formulated. The method derives its mathematical foundation from a two-sided Laplace transform in the space variable with a Fourier transform in the angular variable. The mathematical solution requires that the scalar flux at the boundaries and interfaces (the boundary and interface functions) satisfy systems of singular integral equations. The theory shows that a rather simple numerical method for the solution of the transport equation is feasible which uses only edge- and interface function approximations and no interior space points in the main program. This drastically reduces the order of the associated matrix problem as well as improving the computational execution time on the computer. A computer code has been implemented and numerical results are presented and compared with a reference solution and solutions obtained by conventional methods for one and two region problems. (ERA citation 05:029829)

CTH-RF-33 PC **A02**/MF **A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Institutionen foer Reaktorfysik.
Roots to an Equation in Particle Slowing down Theory.
N. G. Sjoestrand. Aug 79, 8p
U.S. Sales Only.

Previous work on the roots to an equation arising in studies on anisotropic neutron scattering has been extended to include parameter values of interest for a problem put forward by M.M.R. Williams. Detailed numerical results are given. (Atomindex citation 11:509984)

FEI-894 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Questions of Theoretical Analysis of Data on Neutron Transmission in the Unresolved Resonance Region.
A. V. Komarov, and A. A. Luk'yanova. 1979, 12p
In Russian.
U.S. Sales Only.

Methods of forming theoretical model formulas for mean transmissions by resonance and their integrals with respect to the sample thickness n (where n is the product of nuclear density in the sample and its linear dimension along a beam) have been considered for the unresolved resonance region. The convenient forms of the rational approximation of integrals with respect to absorption functions in limited ranges have been obtained. The possibilities to conduct the mathematically consistent physical analysis of data on neutron transmission in the unresolved resonance region have been shown. (Atomindex citation 11:507293)

FOA-C-20321 PC **A03**/MF **A01**
Hagfors Observatorium, Stockholm (Sweden).
KVAST - A Computer Program for Calculation of the Radiation Protection Offered by Buildings Against Residual Radiation.
E. Elvers, M. Nilsson, and G. Danielson. Aug 79, 44p
In Swedish.
U.S. Sales Only.

A computer code is described, which calculates the radiation shielding offered by buildings against radiation from radioactive fallout. The code was designed for use in the context of nuclear explosions, but is also appliable to major accidents with power reactors. (Atomindex citation 11:509990)

FRNC-TH-852 PC **A06**/MF **A01**
Toulouse-3 Univ. (France).
Radiobiological Application of Simulation of Low-Energy Electron Transport in Liquid Water.
T. Eudaldo Puell. 1979, 101p
In French.Thesis.
U.S. Sales Only.

A Monte-Carlo transport simulation method, so-called event-after-event method provide results about trajectories of low-energy electrons, slowing-down in liquid water. A radiosensitive target model constituted by water cylindrical volumes, like the ones which surround the DNA molecule, is taken into consideration. The results characterizing the primary physical stage of radiation action, such as, space ionization distributions, interionization distance distributions ..., are obtained in some configurations constituted by single or several targets, in order to approach the biological reality. (Atomindex citation 11:507290)

HEDL-SA-2072-FP PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Monte Carlo Applications at Hanford Engineering Development Laboratory.
L. L. Carter, R. J. Morford, and A. D. Wilcox. Mar 80, 36p CONF-800471-5
Contract AC14-76FF02170
Seminar on theory and applications of Monte Carlo methods, Oak Ridge, TN, USA, Apr 1980.

Twenty applications of neutron and photon transport with Monte Carlo have been described to give an overview of the current effort at HEDL. A satisfaction factor was defined which quantitatively assigns an overall return for each calculation relative to the investment in machine time and expenditure of manpower. Low satisfaction factors are frequently encountered in the calculations. Usually this is due to limitations in execution rates of present day computers, but sometimes a low satisfaction factor is due to computer code limitations, calendar time constraints, or inadequacy of the nuclear data base. Present day computer codes have taken some of the burden off of the user. Nevertheless, it is highly desirable for the engineer using the computer code to have an understanding of particle transport including some intuition for the problems being solved, to understand the construction of sources for the random walk, to understand the interpretation of tallies made by the code, and to have a basic understanding of elementary biasing techniques. (ERA citation 05:029818)

INIS-mf-5474 PC **A06**/MF **A01**
Nuclear Energy Agency, Paris (France).
OECD Nuclear Energy Agency. 7. Activity Report 1978.
1978, 105p
U.S. Sales Only.

This work is concerned with trends in nuclear power; basic radiation protection norms and their application; radiation protection considerations relating to the nuclear fuel cycle; radioactive waste management; safety research for reactors, nuclear ships and fuel cycle; licensing of nuclear installations; nuclear law; nuclear fuel cycle studies; technical cooperation; scientific support for nuclear technology and NEA data bank. (Atomindex citation 11:509339)

JINR-R-11-11800 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Calculation of alpha -Particle Ranges in Multicomponent Substances.
J. Bogancs, A. Nagy, and A. Szabo. 1978, 13p
In Russian.
U.S. Sales Only.

A method for calculating alpha particle ranges (anti R in multicomponent substances is described on the basis of alpha particle stopping power dE/dx. The study is aimed at obtaining the boron concentration and distribution in thin surface layers of se-

miconductors, glassy metals and biological objects. Anti R values versus alpha particle energy losses and chemical compositions of substances under investigation are presented in tables. The anti R limits for different compounds are given. (Atomindex citation 10:464133)

JINR-R-13-12466 PC A02/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of Radiation Safety.
IBR-2 Reactor Physical Start-Up. Measurement of Neutron Leakage Spectrum.
V. A. Arkhipov, M. M. Komochkov, S. V. Kulikov, and A. Stpiczynski. 1979, 16p
In Russian.
U.S. Sales Only.

The results of measuring the IBR-2 leakage neutron spectrum are presented. The measurements of spectrum have been carried out on the surface of the moderator (5 cm H sub 2 O) by means of activation detectors and 8 m far from moderator using a Bonner spectrometer. Comparison of experimental results with calculation data is given. It is found that on the surface of moderator the flux density of thermal neutrons with E < Esub(cd) equals 3x10 exp 6 n/cm s Wt. From the measured neutron spectrum the absorbed and equivalent dose rates have been calculated. 8 m far from moderator the equivalent dose rate equals 50 mrem/h Wt. (Atomindex citation 11:508399)

JINR-R-16-12122 PC A02/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR).
Test of the Detector Indication Adequacy for Dosimetric Control of Equivalent and Absorbed Doses in the IBR-30 Neutron Beam.
V. E. Aleinikov, V. A. Arkhipov, V. P. Bamblevskii, G. Ya. Kaskanov, and M. M. Komochkov. 1979, 16p
In Russian.
U.S. Sales Only.

The aim of the project was to establish adequacy of different personal dosimeter readings to dose equivalent in the IBR-30 reactor beam with well defined neutron flux density and energy spectra in a wide energy range of 0.01 eV up to 15 MeV. The irradiation was performed with neutrons in a low backscatter environment, the dosimeters being arranged not only on a tissue equivalent phantom but also free in air. The results obtained with different dosimeters witll be compared and related to those of the reference monitors. Recombination ionization chamber and activation detectors were used as reference monitors. The comparison has shown the discrepancy between the results obtained with the personal dosimeters and those of the reference monitors. The main underestimation of the film badge readings is due to the Pu+Be source incorrectly used as a calibration source. (Atomindex citation 11:509164)

K/OA-4660 PC A02/MF A01
Oak Ridge Gaseous Diffusion Plant, TN.
Review of NDA Technology for Enrichment Plant Safeguards.
E. Ricci, L. W. Fields, and J. E. Rushton. 1980, 10p CONF-800655-22
Contract W-7405-ENG-26
21. annual meeting of the Institute of Nuclear Materials Management, Palm Beach, FL, USA, 30 Jun 1980.

A review of nondestructive assay technology for enrichment plant safeguards is presented with emphasis on field experience. Actual and potential applications of this technology in domestic and international safeguards are described. Domestic applications of NDA emphasize verification of uranium enrichment in UF sub 6 storage cylinders and measurement of uranium in scrap and waste materials. International applications also would involve measurements to detect covert production of uranium enrichments above declared values. The state of development and application of standard techniques, e.g. gamma-ray and passive neutron assay of exp 235 U in UF sub 6 cylinders, are reviewed critically based on experience at the US gaseous diffusion plants. Random driver measurements and segmented gamma scanning of wastes and trap materials are described. New instruments such as portable intrinsic Ge detectors and enrichment monitors for gaseous UF sub 6 are identified. (ERA citation 05:028539)

KFKI-1979-59 PC A03/MF A01
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Nonlinear Functions of Activity Adsorbed on the Surface of Primary Circuits of Reactors.
Sz. Vass, I. Kulesh, M. Roder, R. Schiller, and Zs. Ambrus. Oct 79, 27p
In Russian.
U.S. Sales Only.

An attempt is made to formulate a nonlinear physico-chemical model of the accumulation of radioactive products on the surface of primary circuits of nuclear reactors, one of the main source of biological hazards. The main processes contributing to the production and the deposition of surface contaminants are taken to be the solution and activation of construction materials and of their corrosion products, reversible sorption processes such as adsorption and ion exchange from the coolant. An analytical approximation method is given for the evaluation of the extent of surface activity as a function of time. (Atomindex citation 11:508385)

KFTI-78-17 PC A03/MF A01
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Classical Theory of Fast Particle Radiation in Crystals.
A. I. Akhiezer, I. A. Akhiezer, and N. F. Shul'ga. 1978, 29p
In Russian.
U.S. Sales Only.

The radiation of soft photons by fast particles, moving in a crystal in the vicinity of one of the crystallographical planes is studied. General formulas for the spectral distribution and intensity of radiation are obtained, which are valid in the case of arbitrary potentials. The spectrum and the full intensity of radiation are determined both under the conditions of channeling and its absence. Analyzed is the dependence of radiation intensity on the moving particle charge sign, on the crystal temperature and on its angular scattering of beam particles is analyzed. (Atomindex citation 11:506522)

LA-UR-80-1591 PC A02/MF A01
Los Alamos Scientific Lab., NM.
Neutron Cross Section Measurements at WNR.
P. W. Lisowski, G. F. Archampaugh, M. S. Moore, G. L. Morgan, and R. E. Shamu. 1980, 14p CONF-800551-13
Contract W-7405-ENG-36
Symposium on neutron cross sections from 10 - 50 MeV, Upton, NY, USA, 12 May 1980.

The Weapons Neutron Research Facility has been used to obtain moderate-resolution total neutron cross section data for H, C, exp 208 Pb, exp 232 Th, exp 238 U, and exp 242 Pu over the energy range 5 to 200 MeV. Neutrons were produced by bombarding a 2.5-cm diam by 15-cm long Ta target with an 800 MeV pulsed proton beam from LAMPF. A 10.2-cm diam by 15.2-cm thick NE110 proton recoil detector was used at a flight path of 32 meters, giving a time-of-flight resolution of 60 ps/m. The total cross section results are compared to ENDF/BV evaluations and to previous data where possible. (ERA citation 05:031314)

LA-UR-80-1592 PC A03/MF A01
Los Alamos Scientific Lab., NM.
Status of High Energy Neutron Cross Sections.
J. C. Browne, and P. W. Lisowski. 1980, 31p CONF-800551-12
Contract W-7405-ENG-36
Symposium on neutron cross sections from 10 - 50 MeV, Upton, NY, USA, 12 May 1980.

Review is presented of the current status of neutron-induced reactions of interest to the fusion community in the 10- to 50-MeV neutron energy range. Although there has been significant activity in this area since the 1977 BNL Symposium on Neutron Cross Sections from 10 to 40 MeV, this review concludes that there are many areas which require more experimentation to obtain the requested accuracy. Examples of various neutron data obtained since 1977 are presented and compared to determine the extent of agreement. An attempt is made to determine what the prospects are for satisfying the fusion data needs defined by the US DOE based upon progress to date. (ERA citation 05:031315)

LA-UR-80-1789 PC A02/MF A01
Los Alamos Scientific Lab., NM.
Nondestructive Measurements on Spent Fuel for the Nuclear Fuel Cycle.
D. D. Cobb, and J. R. Phillips. 1980, 13p CONF-800655-14
Contract W-7405-ENG-36
21. annual meeting of the Institute of Nuclear Materials Management, Palm Beach, FL, USA, 30 Jun 1980.

Nondestructive measurements on spent fuel are being developed to meet safeguards and materials managment requirements at nuclear facilities. Spent-fuel measurement technology and its applications are reviewed. (ERA citation 05:030333)

NUREG-0722 PC A04/MF A01
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Material Safety and Safeguards.
The Effects of Natural Phenomena on the Exxon Nuclear Company Mixed Oxide Fabrication Plant at Richland, Washington. Docket No. 70-1257.
Sep 80, 54p

An Analysis of the Effects of Natural Phenomena on the Exxon Nuclear Company Mixed Oxide Fabrication Plant at Richland, Washington has been prepared by the Office of Nuclear Material Safety and Safeguards. The analysis is in support of the Special Nuclear Materials License held by the subject company. It addresses the probable effects of damage to the Exxon Nuclear Company Mixed Oxide Fabrication Plant by severe weather and earthquake and expresses the consequence of damage as dose to several human receptors. The doses that result from facility damage are multiplied by the occurrence rate for the initiating event yielding the yearly risk.

ORNL/TM-7404 PC A05/MF A01
Oak Ridge National Lab., TN.
Acceleration of the Inner Iteration of the DOT-IV Transport Code Using a New Source Correction Scheme.
J. E. Aull. Jul 80, 85p
Contract W-7405-ENG-26

A detailed description of the steady-state Boltzmann transport equation is given. Then the discrete ordinates method of solving the transport equation is described. The conventional rebalance method, the source correction scheme of rebalance, and a new source correction scheme involving a correction equation with a modified flow term are derived. Difference equations for each version of the source correction scheme are presented. The different versions of the source correction scheme and the conventional rebalance method are compared on several test problems in one- and two-dimensional slab geometry. Results are shown that demonstrate that the new source correction scheme is superior to the conventional rebalance method. It is also seen that the new source correction scheme is compatible when used with a weighted difference formulation in the inner iteration of the transport solution. 6 figures, 9 tables. (ERA citation 05:029820)

SAND-80-0366 PC A03/MF A01
Sandia National Labs., Albuquerque, NM.
Observations on the Use of the Consequence Model CRAC for Small Nonreactor Atmospheric Releases.
D. M. Ericson, Jr. May 80, 26p
Contract AC04-76DP00789

As part of the Reactor Safety Study, a consequence model, CRAC, was developed to examine the public consequences of accidental releases of radioactive material from nuclear power plants. Since the development of the model, several studies have been conducted to examine the sensitivity of the model to factors such as plume rise, wind shear, rain, and population evacuation. All of these studies were performed assuming one or more of the potentially large accidental releases from reactor sites. At the same time, CRAC has been used to examine the consequences of sabotage-caused releases from spent fuel during transport. In the most recent study, the consequence estimates obtained with CRAC were compared with those obtained using METRAN, the consequence model developed for the Urban Study. (ERA citation 05:029063)

SSI-1979-017 PC **A02**/MF **A01**
Statens Straalskyddsinstitut, Stockholm (Sweden).
Track Formation in Nuclear Emulsion.
M. Jensen. Sep 79, 24p
U.S. Sales Only.

A review is given of some recent studies where Katz' theory of track formation has been compared to experimental data. The experimental procedures and the calculations have been examined. It is pointed out that light scattered in the forward direction into the ocular's cone of acceptance must be treated differently depending on the structure of the track. It is argued that in some cases the experimental and theoretical track parameters have been chosen in such a way that very few conclusions can be made from the comparisons. Tracks of ions with velocities beta < 0.3 were found to be wider than theory predicts. This may be due to assumption that all secondary electrons follow linear paths. It is concluded that a critical test of the theory must include a critical examination of all theoretical components of the calculations, and the outlines of such a procedure are given. (Atomindex citation 11:509994)

UCRL-83749 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Electrofibrous Prefilters for Use in the Nuclear Industry.
W. Bergman, Hebard, H. D. Taylor, B. Y. Lum, W. D. Kuhl, and R. M. Boling. 1980, 42p CONF-800334-14
Contract W-7405-ENG-48
DOE environmental control symposium, Reston, VA, USA, 17 Mar 1980.

High efficiency particulate air (HEPA) filters are used in the nuclear industry to remove radioactive aerosols. Although these HEPA filters are effective and practical devices, they generate a large volume of radioactive waste and are costly to purchase and operate. In an effort to reduce the HEPA's operational cost and volume of radioactive waste, the Department of Energy (DOE) has contracted with LLNL to develop electrofibrous prefilters to extend the service life of HEPA filters. A comprehensive program has been established to conduct theoretical modelling, small-scale laboratory experiments, prototype development and field evaluations of electrofibrous prefilters. The recent prototype development and field evaluations of this program are reviewed. Compared to a conventional fibrous filter, the electrofibrous filter has a much higher efficiency and a greater service life. The higher efficiency results from electrostatic forces that attract particles to the filter fibers. This electrostatic attraction also causes particles to form a less restrictive deposit around the fibers thereby increasing the filter service life. The electrofibrous filters discussed are generated by applying an electric field across a conventional fibrous filter. Prototype electrofibrous filters have been developed for use in glove boxes and ventilation systems. The results from two field evaluations in radioactive glove boxes indicate the electrofibrous prefilter greatly increases the service life of HEPA filters. In addition, these evaluations show that most of the radioactive material can be recovered from the prefilter. (ERA citation 05:029443)

18G. Radioactive Wastes and Fission Products

AERE-M-3012 PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Materials Development Div.
Progress Towards the Use of Disposable Filters.
I. Macphail. Aug 79, 13p
U.S. Sales Only.

Thermally degradable materials have been evaluated for service in HEPA filter units used to filter gases from active plants. The motivation was to reduce the bulk storage problems of contaminated filters by thermal decomposition to gaseous products and a solid residue substantially comprised of the filtered particulates. It is shown that while there are no commercially available alternatives to the glass fibre used in the filter medium, it would be feasible to manufacture the filter case and spacers from materials which could be incinerated. Operating temperatures, costs and the type of residues for disposal are discussed for filter case materials. (Atomindex citation 11:508625)

AERE-R-9548 PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Chemical Technology Div.
Development of a High Level Radioactive Waste Management Strategy.
H. Beale. Nov 79, 11p
U.S. Sales Only.

The management of high level radioactive waste, from the removal of spent fuel from reactors to final disposal of vitrified waste, involves a complex choice of operational variables which interact one with another. If the various operations are designed and developed in isolation, a suboptimal choice will almost certainly result. Management of highly active waste should therefore be viewed as a complete system and analysed in such a way that account is taken of the interactions between the various operations. This system must have clearly defined and agreed objectives as well as criteria against which performance can be judged. A thorough analysis of the system will provide a framework within which the necessary research and development can be carried out in a co-ordinated fashion and lead to an optimised strategy for managing highly active wastes. (Atomindex citation 11:509263)

ARH-SA-203 PC **A04**/MF **A01**
Atlantic Richfield Hanford Co., Richland, WA.
Bidentate Organophosphorus Extraction of Americium and Plutonium from Hanford Plutonium Reclamation Facility Waste.
W. W. Schulz. Sep 74, 65p CONF-750607-57
Contract AM06-76RL02130
American Nuclear Society meeting, New Orleans, LA, USA, 8 Jun 1975.

Applicability of bidentate organiphosphorus reagents to recovery of americium and plutonium from Hanford's Plutonium Reclamation Facility acid (approx. 2M HNO sub 3) waste stream (CAW solution) was studied. A solvent extraction process which employs a 30% DHDECMP (dihexyl-N, N-diethylcarbamylmethylene phosphonate)-CCl sub 4 extractant was devised and successfully tested in mixer-settler runs with actual CAW solution. Substitution of DHDECMP for DBBP eliminates the need to perform careful neutralization of unbuffered CAW soluton and increases overall americium recovery from the present 60 to 80% level to greater than or equal to 90%. Disadvantages to such substitution include the high cost (approx. $50/liter) of DHDECMP and the need to purify it (by acid (6M HCl) hydrolysis and alkaline washing) from small amounts of an unidentified impurity which prevents stripping of americium with dilute HNO sub 3 . Distribution data obtained in this study confirm Siddall's earlier contention that bidentate organophosphorus regents can be used to remove actinides from concentrated high-level Purex process acid waste; a conceptual flowsheet for such an extraction process is given. (ERA citation 05:030266)

CEA-R-4946 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Developpement des Elements Combustibles.
Plutonium Separation by Reduction Stripping. Application to Processing of Mixed Oxide (U,Pu)O sub 2 Fuel Fabrication Wastes.
T. Arnal, G. Cousinou, and M. Ganivet. Nov 78, 34p
In French.
U.S. Sales Only.

A procedure is described for separating plutonium from a uranium VI and plutonium IV mixture contained in an organic phase (tributyl phosphate diluted in dodecane). This separation is obtained by extracting the plutonium III using two organic reducers: hydrazine and paraminophenol. Paraminophenol has excellent reducing qualities, similar to those of ferrous sulphamate, but has the added advantage of not contaminating extracted plutonium. This procedure is currently used in processing production wastes from mixed oxide (U,Pu)O sub 2 fuels; the installation using this procedure is described in detail in this paper. Operating results show the remarkable efficiency of this procedure: the separated plutonium and uranium mass flows have been increased to 185 and 350 g.h exp -1 respectively; the uranium contains less than 0.1 ppm of plutonium on completion of the purification cycle. (Atomindex citation 11:507884)

DOE/SR-WM-79-2 PC **A05**/MF **A01**
Department of Energy, Aiken, SC. Savannah River Operations Office.
Hydrology of Buried Crystalline Rock at Savannah River Plant Near Aiken, South Carolina.
I. W. Marine. Oct 79, 76p
Contract AC09-76SR00001

The purpose of this report is to present the results of hydrologic investigations that were made on buried crystalline rock at the Savannah River Plant in connection with an investigation of the feasibility of storing high-level radioactive waste in artificially excavated chambers in the rock. The methods pursued in this investigation may be applicable to other investigations of low permeability metamorphic and igneous rocks. Fractures occurring in single boreholes were investigated by core inspection, geophysical logs, packer tests, and in-hole tracer tests. The correlation of fractures between holes was based on the rapidity of water level response to hydraulic activities in nearby wells and on an in-hole tracer test conducted in one boring while a nearby boring was being pumped. Values for hydraulic conductivity and other hydraulic parameters were determined from laboratory tests, packer tests, pumping tests, a two-well tracer test, and a numerical model that duplicated the results of a year-long pumping test. Dispersivity of the fractured crystalline rock was determined using a two-well tracer test. Water geochemistry and isotropic composition were evaluated. The age of the water was determined to be about 840,000 years. The average velocity of regional flow in crystaline rock is about 0.2 ft/y. (ERA citation 05:030297)

DP-MS-80-25 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
High-Level Nuclear Waste Immobilization Program.
D. E. Gordon. 1980, 18p CONF-800244-1
Contract AC09-76SR00001
ASME, IEEE, and Society of Professional Engineer Joint meeting, New London, CT, USA, 18 Feb 1980.

Existing high-level nuclear wastes in the United States are described along with current management techniques and long-term disposal options. All of the disposal options involve some type of immobilization operation to restrict radio-nuclide dispersion; the primary option is disposal of immobilized waste packages in deep (500-1000 meter) geological formations. Several immobilized waste forms currently under development are discussed, and form selection factors and regulatory criteria are identified. (ERA citation 05:028468)

EML-378 PC **A02**/MF **A01**
Department of Energy, New York. Environmental Measurements Lab.
Exposure Rate Conversion Factors for Radionuclides Deposited on the Ground.
H. L. Beck. Jul 80, 10p

Activity to exposure rate conversion factors are given for particulate gamma-emitting fission products and for a number of particulate activation products and residual nuclear materials which might be deposited on the ground as a result of weapons tests or other nuclear activities. (ERA citation 05:031145)

ENICO-1037 PC **A03**/MF **A01**
Exxon Nuclear Idaho Co., Inc., Idaho Falls.
Comparison of HEPA Filter Test Methods in Corrosive Environments.
L. P. Murphy, S. J. Fernandez, and B. G. Motes. Jul 80, 31p
Contract AC07-79ID01675

An evaluation of the three HEPA filter test methods in corrosive environments was conducted: the dioctyl phthalate (DOP) method (US Standard

Method ANSI N-101.1-1972), the sodium chloride method (British Standard 3928:1969), and the soda-fluorescein or uranine method (French Standard AFNOR STD NFX 44-011). The effects of humidity, temperature and oxides of nitrogen (NO/sub x/) on each method was examined. The experimental design used in the evaluation measured and separated both the effect of each variable and any interaction between variables on the test method. Recommendations for changes in the standard methods to reduce erratic online results are presented. (ERA citation 05:028469)

GEFR-SP-215 PC **A03**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Actinide Recycle in LMFBRs as a Waste Management Alternative.
S. L. Beaman. 30 Apr 80, 33p CONF-800743-2
Contract AM03-76SF00893
International conference on nuclear waste transmutation, Austin, TX, USA, 22 Jul 1980.

A strategy of actinide burnup in LMFBRs has been investigated as a waste management alternative to long-term storage of high level nuclear waste. This strategy has been evaluated because many of the actinides in the waste from spent-fuel reprocessing have half-lives of thousands of years and an alternative to geological storage may be desired. By burning the actinides in LMFBRs the long-lived isotopes can be effectively transmuted to fission products which have significantly shorter half-lives. Actinide burnup in LMFBRs rather than LWRs is preferred because the fission to capture reaction rate ratios are higher in the LMFBR, and the LMFBR performance is not highly sensitive to the addition of the actinide waste material. An actinide target assembly recycle scheme has been analyzed to determine the effects of the actinides on the LMFBR performance, including local power peaking, breeding ratio, and fissile material requirements. The overall efficiency of actinide burnout in LMFBRs has been evaluated, and equilibrium cycle conditions have been determined. The results of the actinide recycle study indicate that the actinide wastes produced by a fission reactor economy could be transmuted in fast reactors with only a two percent penalty in the fissile loading requirements and a one to two percent penalty in the breeding ratio of the host reactors. The actinide target assemblies could be tailored to give a power distribution which is comparable to that of the standard fuel assemblies. However, the total shutdown decay heat from a target assembly would be approximately 43 percent greater than that from a standard assembly. (ERA citation 05:028470)

HEDL-SA-2009-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Remotely Operated Organic Liquid Waste Incinerator for the Fuels and Materials Examination Facility.
W. L. Sales, R. E. Barker, and R. B. Hershey.
1980, 12p CONF-800607-66
Contract AC14-76FF02170
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

The search for a practical method for the disposal of small quantities of oraganic liquid waste, a waste product of metallographic sample preparation at the Fuels and Materials Examination Facility has led to the design of an incinerator/off-gas system to burn organic liquid wastes and selected organic solids. The incinerator is to be installed in a shielded inert-atmosphere cell, and will be remotely operated and maintained. The off-gas system is a wet-scrubber and filter system designed to release particulate-free off-gas to the FMEF Building Exhaust System. (ERA citation 05:028471)

HEDL-SA-2055 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Remote Characterization of Spent LWR Fuel for Geologic Disposal Demonstrations.
R. B. Davis, R. L. Fish, V. Pasupathi, and D. E. Stellrecht. Mar 80, 20p CONF-800607-78
Contract AC14-76FF02170
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

State-of-the-art hot cell examination techniques are being used to evaluate spent fuel performance during exposure to simulated geologic repository environments. Forty-five pressurized light water reactor fuel rods were examined prior to emplacement in geologic disposal tests. Sufficient data were collected on both cladding and fuel to provide a basis, along with post-test examination data, for assessing the ability of the spent fuel to retain radionuclides. (ERA citation 05:028487)

IAEA-R-1898-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Work within the Coordinated Programme on Environmental Evaluation and Hazard Assessment of the Separation of the Actinides from the High-Level Waste from Fuel Reprocessing Followed by Either Transmutation or Separate Disposal. Final Report for the Period 1 November 1976 - 31 October 1977.
H. O. Haug. Apr 78, 8p
U.S. Sales Only.

Reduction of plutonium losses in non-high-level wastes streams from fuel reprocessing is important in the conventional post-fission operations and would be essential in any actinide partitioning alternatives. The balance of input process streams and output waste streams in present reprocessing technology is compared to the balance after process modifications based on recent experimental developments. The results are showing that by the introduction of new electrochemical redox processes and non-salt-forming process chemicals the routinely generated intermediate-level waste streams from PUREX reprocessing can be avoided. Plutonium-bearing waste streams can be extensively recycled within the chemical processing. (Atomindex citation 11:507888)

INIS-mf-4482 PC **A02**/MF **A01**
Central Electricity Generating Board, London (England).
Encapsulation of Magnox Type Fuel Elements for Extended Storage in Cooling Ponds.
D. W. C. Baker, and G. A. Burt. 1978, 7p CONF-780658-2
Seminar on the storage of spent fuel elements, Madrid, Spain, Jun 1978.
U.S. Sales Only.

A method of encapsulating spent fuel elements in a protective plastics medium to enable them to be stored for protracted periods under water, without risk of further significant corrosion, has been developed. It is visualised that the elements after discharge from the reactor would be allowed to cool under water for a period of at least 100 days and would then be encapsulated while remaining immersed. A suitable two pack system based on a solvent free epoxy resin cured with an aromatic amine adduct has been identified. The equipment and processes which have been developed for handling, conditioning and encapsulating the fuel are described. (Atomindex citation 09:419285)

INIS-mf-5464 PC **A04**/MF **A01**
Bremen Univ. (Germany, F.R.).
Radioecological Experts' Opinions on Waste Water of Esensham Nuclear Power Plant. Final Report of a Part of the Project: Pollution at the Place of Work and in the Lower Weser Industrialized Region.
M. Bliefert, R. Marks, A. Meier, and M. Wallenschus. Jul 78, 51p
In German.
U.S. Sales Only.

In December 1977, there was a public hearing by the Oldenburg administrative court where, among others, evidence was heard on whether the experts' opinions on the discharge of liquid radioactive waste into the river Weser, for which licence has already been granted, contain some major errors so that the licences already granted would have to be revoked. This part of the long and tedious administrative lawsuit is reported. (Atomindex citation 11:509302)

INIS-mf-5573 PC **A04**/MF **A01**
Sovet Ekonomicheskoi Vzaimopomoshchi, Moscow (USSR). Postoyanniya Komissiya po Ispol'zovaniyu Atomnoi Energii v Mirnykh Tselyakh.
Research on Desctivation of Liquid, Solid and Gaseous Radioactive Wastes and Decontamination of Surfaces. Part 4.
1978, 72p CONF-761260-(Pt.4)
In Russian.Conference on processing and disposal of radioactive wastes and on decontamination of surfaces, Moscow, USSR, 20 Dec 1976.
U.S. Sales Only.

Problems of decontamination of equipment and compartments of nuclear power plants are concidered. General review of decontamination methods, applied in nuclear research centers and nuclear power plants are given. Some papers are devoted to problems of development and testing of particular methods for decontamination of different materials of circuits and demountable equipment; easily removable decontaminating and protective coatings and development of some types of technical means for carrying out decontamination processes. (Atomindex citation 11:513828)

LA-UR-80-1794 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
A L-NCI/G Sensitivity Transuranic Waste Assay System Using Pulsed Neutron Interrogation.
W. E. Kunz, J. D. Atencio, and J. T. Caldwell. 1980, 8p CONF-800655-6
Contract W-7405-ENG-36
21. annual meeting of the Institute of Nuclear Materials Management, Palm Beach, FL, USA, 30 Jun 1980.

We have developed a pulsed thermal neutron interrogation system and have demonstrated a sub-1-nCi/g assay sensitivity for high density TRU wastes contained in 200-liter barrels. We detect prompt fission neutrons, resulting in greatly enhanced sensitivity compared to techniques in which delayed fission neutrons are detected. We observe a linear assay response over at least three orders of magnitude in exp 235 U (or exp 239 Pu) mass. We also have measured a flat (to +- 10%) interrogation flux profile throughout the volume of a 200-liter barrel filled with 200 kg of sand and vermiculite, which indicates flatness of response to fissile material at different locations within the barrel. (ERA citation 05:030264)

LA-8339-PR PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Laboratory Studies of Radionuclide Distributions Between Selected Groundwaters and Geologic Media. Progress Report, January 1-March 31, 1980.
B. R. Erdal. May 80, 55p
Contract W-7405-ENG-36

This report covers the technical activities on Waste-Rock Interactions and Technology (WRIT) contracts B-A2377-A-K and 78996-A-K to the Los Alamos Scientific Laboratory. Much of the activity during the second quarter of FY-80 involved those sorption studies needed to extend the current data base for tuff, to continue studies of sorption isotherms, to continue chemical analysis and characterization techniques, to continue studies using the microautoradiographic technique, and to continue measurements of migration rates in crushed and fractured materials. Finally, preparation of status reports has involved appreciable effort. (ERA citation 05:030300)

LBL-10517 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Rock Properties and Their Effect on Thermally-Induced Displacements and Stresses.
T. Chan, M. Hood, and M. Board. Feb 80, 22p CONF-800204-10
Contract W-7405-ENG-48
Energy-sources technology conference, New Orleans, LA, USA, 3 Feb 1980.

A discussion is given of the importance of material properties in the finite-element calculations for thermally induced displacements and stresses resulting from a heating experiment in an in-situ granitic rock, at Stripa, Sweden. Comparisons are made between field measurements and finite element method calculations using (1) temperature independent, (2) temperature dependent thermal and thermomechanical properties and (3) in-situ and laboratory measurements for Young's modulus. The calculations of rock displacements are in-

fluenced predominantly by the temperature dependence of the thermal expansion coefficient, whereas the dominant factor affecting predictions for rock stresses is the in-situ modulus. (ERA citation 05:028488)

MAFF-FL-17 PC **A02**/MF **A01**
Ministry of Agriculture, Fisheries and Food, Lowestoft (England). Fisheries Radiobiological Lab.
Observations on the Use of Cost-Benefit Analysis in the Control of Radioactive Waste Disposal.
J. G. Shepherd, and J. A. Hetherington. Oct 75, 5p
U.S. Sales Only.

The disposal of radioactive waste to the environment can lead to the irradiation of large numbers of people, and although the individual doses may be very small compared with the ICRP dose limits the total population dose may not be insignificant. In these circumstances the control procedure is likely to be determined by the requirement that doses be kept 'as low as is readily achievable'(see ICRP-9, para. 52). This recommendation has been interpreted in ICRP-22, where the use of cost-benefit analysis is suggested as a means of application in practice. This paper discusses some of the implications of these recommendations in relation to the control of radioactive waste disposal, under the following headings: the use of collective dose; the costing of collective dose; the assessment and use of detrimental costs; and the payment of detrimental costs. (Atomindex citation 11:509282)

MLM-2703(OP) PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Development of a Radon Monitoring Plan for Canonsburg, Pennsylvania.
W. G. Yates, and P. H. Jenkins. 1980, 4p CONF-800334-9
Contract EY-76-C-04-0053
DOE environmental control symposium, Reston, VA, USA, 17 Mar 1980.

The site of the former Vitro Rare Metals Plant, now called the Canon Industrial Park, has been found to be contaminated with large quantities of radioactive wastes generated during former radium and uranium recovery operations. This report describes the development of a comprehensive radon monitoring program in the environment surrounding the site. (ERA citation 05:029603)

MLM-2713 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Commercial Cyclone Incinerator Demonstration Program: October 1979-March 1980.
B. M. Alexander. 21 May 80, 15p
Contract AC04-76DP00053

The commercial cyclone incinerator program was designed to study the effects of burning low-level waste contaminated with beta and gamma emitters in a cyclone system. The ultimate program goal is the demonstration of a cyclone incinerator at a nuclear power plant. During the past six months, progress was made toward achieving the second program objective, Complete Incinerator Feasibility Plan. Forty-one laboratory-scale experiments were completed, with five more experiments remaining to be performed. Sample analysis from completed experiments continues. A promising scrub liquor was identified and is now being used for improved absorption of iodide and chloride from incinerator offgas. Inconel 601 continues to perform well as the material of construction for the laboratory-scale burn chamber. (ERA citation 05:028472)

MLM-2735 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Development of Ultrafiltration and Adsorbents: October 1979-March 1980.
R. C. Roberts, and C. M. Colvin. 2 Jul 80, 18p
Contract AC04-76DP00053

Tests on a sample of trench water from the Maxey Flats burial ground effectively demonstrated the new Reverse Osmosis Pilot Plant. The effluent from the 50% salt-rejection membrane was decontaminated well enough with the exception of tritium to be discharged to the environment. The performance of the 97% salt-rejection membrane was superior to that of the 50% membrane. A breakthrough and capacity experiment was conducted with Durasil 10 on a simulated Three Mile Island solution. The maximum decontamination factor was extrapolated to be 10 exp 6 , which would reduce the cesium level of TMI water to below the discard limit. Capacity (1/DF = 0.5) was reached at 1260 column volumes. Several adsorbents were tested in the engineering columns for decontamination of cesium-bearing solutions. Under the conditions of the experiment, these adsorbents were ineffective in removing cesium from the solution. (ERA citation 05:028473)

NRPB-R-86 PC **A05**/MF **A01**
National Radiological Protection Board, Harwell (England).
Analysis of the Effect of Variations in Parameter Values on the Predicted Radiological Consequences of Geologic Disposal of High-Level Waste.
M. D. Hill. Jun 79, 81p
U.S. Sales Only.

A preliminary assessment of the radiological consequences of geologic disposal of high-level waste (Hill and Grimwood. NRPB-R69 (1978)) identified several areas where further research is required before this disposal option can be fully evaluated. This report is an analysis of the sensitivity of the results of the preliminary assessment to the assumptions made and the values of the parameters used. The parameters considered include the leach rate of the waste, the ground-water velocity, the length of the flow path from the repository to a source of drinking water and the sorption constants of the principle radionuclides. The results obtained by varying these parameters are used to examine the effects of assumptions such as the time at which leaching of the waste begins. The sensitivity analysis shows the relative importance of the waste canisters, the waste form and the geologic barrier to radionuclide migration in determining potential doses. These results are used to identify research priorities, establish preliminary design criteria and indicate developments needed in the mathematical modelling of the movement of radionuclides from a repository to the biosphere. (Atomindex citation 11:508370)

NUREG/CR-1445 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Preparation of Working Reference Materials: Calcined Waste Recovery Products Containing Uranium or Plutonium,
J. E. Rein, and G. R. Waterbury. Aug 80, 15p LA-8348
Contract W-7405-eng-36

This report provides guidance for preparing working reference materials of calcined waste recovery products containing uranium or plutonium. These materials are used to calibrate and maintain quality control surveillance of chemical methods of analysis for uranium and plutonium content and isotopic distribution measurements.

NVO-196-15 PC **A04**/MF **A01**
Department of Energy, Las Vegas, NV. Nevada Operations Office.
Nevada Nuclear Waste Storage Investigations. Quarterly Report, January-March 1980.
Jun 80, 65p

The Nevada Nuclear Waste Storage Investigations (NNWSI) consist of a variety of studies and evaluations in support of the US Nuclear Waste Management Program. The NNWSI are primarily oriented towards developing or improving the technology of nuclear waste storage and disposal and determining whether selected underground rock media on or adjoining the Nevada Test Site (NTS) are technically acceptable for a licensed, permanent, high-level nuclear waste repository. The NNWSI Project for FY 1980 is comprised of eight tasks which are divided into subtasks: weapons test seismic investigations, geologic and hydrologic investigations, media investigations, engineering and technical support, quality assurance, technical review, Climax spent fuel test, and National Waste Terminal Storage Program support. (ERA citation 05:030265)

ONWI-9(4) PC **A17**/MF **A01**
Battelle Columbus Labs., OH.
Technical Progress Report for the Quarter July 1-September 30, 1979.
1979, 394p
Contract AC06-76RL01830

This report describes the technical accomplishments on the commercial nuclear waste management programs under the direction of the Office of Nuclear Waste Isolation (ONWI). The ONWI program is designed to provide all of the technology and engineering design bases for a waste repository to isolate nuclear waste safely, with protection to the environment. (ERA citation 05:030305)

ORNL/TM-6983 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Actinide Partitioning-Transmutation Program Final Report. III. Transmutation Studies.
J. W. Wachter, and A. G. Croff. Jul 80, 59p
Contract W-7405-ENG-26

Transmutation of the long-lived nuclides contained in fuel cycle wastes has been suggested as a means of reducing the long-term toxicity of the wastes. A comprehensive program to evaluate the feasibility and incentives for recovering the actinides from wastes (partitioning) and transmuting them to short-lived or stable nuclides has been in progress for 3 years under the direction of Oak Ridge National Laboratory (ORNL). This report constitutes the final assessment of transmutation in support of this program. Included are (1) a summary of recent transmutation literature, (2) a generic evaluation of actinide transmutation in thermal, fast, and other transmutation devices, (3) a preliminary evaluation of exp 99 Tc and exp 129 I transmutation, and (4) a characterization of a pressurized-water-reactor fuel cycle with and without provisions for actinide recovery and transmutation for use in other parts of the ORNL program. The principal conclusion of the report is that actinide transmutation is feasible in both thermal and fast reactors, subject to demonstrating satisfactory fuel performance, with relatively little impact on the reactor. It would also appear that additional transmutation studies are unwarranted until a firm decision to proceed with actinide transmutation has been made by the responsible authorities. (ERA citation 05:030277)

ORNL-5617 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Autoradiographic Study of Actinide Sorption on Climax Stock Granite.
G. W. Beall, G. D. O'Kelley, and B. Allard. Jun 80, 30p
Contract W-7405-ENG-26

An autoradiographic technique that employed an arrangement for placing in firm contact Polaroid sheet film, a scintillator screen, and the radioactive face of a specimen was applied to a study of the sorption of americium, neptunium, plutonium, and uranium on Climax Stock granite under varying conditions of pH and Eh. Qualitative agreement was found between the sorption of americium on crushed, pure minerals and on the minerals comprising the specimen of Climax Stock granite. The observations also supported a mechanism for reduction of Np(V) to Np(IV) and Pu(VI) to Pu(IV) by Fe(II)-containing minerals. There was no evidence for reduction of U(VI) by the Fe(II)-containing minerals, although the uranium, assumed to be present as UO sub 22+ , appeared to be the only actinide species to exhibit sorption by a simple, cation-exchange mechanism at particular mineral sites. Some implications of these results for nuclear waste isolation are discussed briefly. (ERA citation 05:030306)

PATENT-4 164 479 Not available NTIS
Department of Energy, Washington, DC.
Method for Calcining Nuclear Waste Solutions Containing Zirconium and Halides.
Patent,
B. J. Newby. Filed 12 Jan 78, patented 14 Aug 79, 6p PAT-APPL-868 953
Supersedes PAT-APPL-868 953-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A reduction in the quantity of gelatinous solids which are formed in aqueous zirconium-fluoride

nuclear reprocessing waste solutions by calcium nitrate added to suppress halide volatility during calcination of the solution while further suppressing chloride volatility is achieved by increasing the aluminum to fluoride mole ratio in the waste solution prior to adding the calcium nitrate. (ERA citation 05:030283)

PNL-2858 PC **A03**/MF **A01**
Arizona Univ., Tucson.
Hydrogeologic Effects of Natural Disruptive Events on Nuclear Waste Repositories.
S. N. Davis. Jun 80, 41p
Contract AC06-76RL01830

Some possible hydrogeologic effects of disruptive events that may affect repositories for nuclear wastte are described. A very large number of combinations of natural events can be imagined, but only those events which are judged to be most probable are covered. Waste-induced effects are not considered. The disruptive events discussed above are placed into four geologic settings. Although the geology is not specific to given repository sites that have been considered by other agencies, the geology has been generalized from actual field data and is, therefore, considered to be physically reasonable. The geologic settings considered are: (1) interior salt domes of the Gulf Coast, (2) bedded salt of southeastern New Mexico, (3) argillaceous rocks of southern Nevanda, and (4) granitic stocks of the Basin and Range Province. Log-normal distributions of permeabilities of rock units are given for each region. Chapters are devoted to: poresity and permeability of natural materials, regional flow patterns, disruptive events (faulting, dissolution of rock forming minerals, fracturing from various causes, rapid changes of hydraulic regimen); possible hydrologic effects of disruptive events; and hydraulic fracturing. (ERA citation 05:028490)

PNL-2928 PC **A06**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of Effectiveness of Geologic Isolation Systems. Perspectives on the Geological and Hydrological Aspects of Long-Term Release Scenario Analyses.
J. A. Stottlemyre, R. W. Wallace, G. L. Benson, and J. T. Zellmer. Jun 80, 123p
Contract AC06-76RL01830

Information that may be relevant to individuals involved with analyzing long-term release scenarios of specific repositories for nuclear waste is presented. The bulk of the information is derived from recent studies in West Germany and the United States. Emphasis is on the specific geological and hydrological phenomena that, alone or in concert, could potentially perturb the area around specific repository sites. Research is continuing on most of the topics discussed within this report. Because research is ongoing, statements and conclusions described in this document are subject to change. The main topics of this report are: (1) fracturing, (2) geohydrology, (3) magmatic activity, and (4) geomorphology. Therefore, the site-specific nature of the problem cannot be overemphasized. As an example of how one might combine the many synergistic and time-dependent parameters into a concise format the reader is referred to A Conceputal Simulation Model for Release Scenario Analysis of a Hypothetical Site in Columbia Plateau Basalts, PNL-2892. For additional details on the topics in this report, the reader is referred to the Pacific Northwest Laboratory (PNL) consultant report listed in the bibliography. (ERA citation 05:028491)

PNL-3244 PC **A23**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Preliminary Evaluation of Alternative Waste Form Solidification Processes. Volume I. Identification of the Processes.
R. L. Treat, J. F. Nesbitt, H. T. Blair, J. G. Carter, and P. S. Gorton. Apr 80, 535p
Contract AC06-76RL01830

This document contains preconceptual design data on 11 processes for the solidification and isolation of nuclear high-level liquid wastes (HLLW). The processes are: in-can glass melting (ICGM) process, joule-heated glass melting (JHGM) process, glass-ceramic (GC) process, marbles-in-lead (MIL) matrix process, supercalcine pellets-in-metal (SCPIM) matrix process, pyrolytic-carbon coated pellets-in-metal (PCCPIM) matrix process, supercalcine hot-isostatic-pressing (SCHIP) process, SYNROC hot-isostatic-pressing (SYNROC HIP) process, titanate process, concrete process, and cermet process. For the purposes of this study, it was assumed that each of the solidification processes is capable of handling similar amounts of HLLW generated in a production-sized fuel reprocessing plant. It was also assumed that each of the processes would be enclosed in a shielded canyon or cells within a waste facility located at the fuel reprocessing plant. Finally, it was assumed that all of the processes would be subject to the same set of regulations, codes and standards. Each of the solidification processes converts waste into forms that may be acceptable for geological disposal. Each process begins with the receipt of HLLW from the fuel reprocessing plant. In this study, it was assumed that the original composition of the HLLW would be the same for each process. The process ends when the different waste forms are enclosed in canisters or containers that are acceptable for interim storage. Overviews of each of the 11 processes and the bases used for their identification are presented in the first part of this report. Each process, including its equipment and its requirements, is covered in more detail in Appendices A through K. Pertinent information on the current state of the art and the research and development required for the implementation of each process are also noted in the appendices. (ERA citation 05:028474)

RHO-C-39 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Comparison of the Microstructure of Hanford Type II Concrete Structures and Test Specimens.
J. L. Daniel, and A. O. Buck. Apr 80, 96p
Contract AC06-77RL01030

High-level radioactive waste from the current waste management operation at Hanford is stored in underground reinforced concrete tanks with a steel liner on the sides and bottom. The removal of pumpable liquid results in a moist salt-cake of sodium salts that is relatively immobile compared to its original liquid state. Additional immobilization and isolation techniques are being studied to further improve waste isolation and containment. Retrieval of the waste and permanent disposal will be deferred until a permanent disposal mode and location is selected. The integrity of the storage tanks is of critical importance during this interim period. Technical studies and laboratory tests have been performed to determine the effect of the stored waste's temperatures and chemistry on the reinforced concrete's strength and elastic properties. However, relatively little attention has been given to studying or predicting very long-term behavior based on short-term specimen examination. This report describes the results of the first phase of a laboratory program for which the ultimate goal is the ability to predict the probable condition of Hanford Type II concrete structures after 100 years of more of lifetime. The purpose of this phase was the evaluation of the microstructure of several existing test and field samples of Hanford concrete, and to correlate microstructural data with the physical test measurements on hand from other programs and tasks. (ERA citation 05:030311)

SAND-79-1109 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Backfill Barrier as a Component in a Multiple Barrier Nuclear Waste Isolation System.
E. J. Nowak. May 80, 32p
Contract AC04-76DP00789

Quantitative estimates of the potential effectiveness of backfill barriers based on a linear sorption model are presented. Using getters such as clays (known sorbents), a backfill approximately 1-foot-thick can delay by 10 exp 4 to 10 exp 5 years the breakthrough of transuranics. A delay of 10 exp 3 years is possible for major cationic fission products. These delays can be achieved provided that (1) the distribution coefficient (K/sub d/, a measure of affinity for sorbed species) for the barrier material is equal to or greater than 2000 ml/g for transuranics and 200 ml/g for fission products; (2) the interstitial groundwater velocity through the barrier is limited to 1 ft/year or less; (3) the effective porosity of the barrier is equal to or less than 0.1; and (4) the physical integrity of the barrier is maintained (no channels or cracks). Mixtures containing expanding clays such as smectites and other getters are expected to satisfy these criteria. (ERA citation 05:028492)

SAND-79-1484 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Status of SHAFT 78 with Respect to Modeling Radioactive Waste Burial in Eleana Argillite, Including Calculations to Date.
R. R. Eaton, W. D. Sundberg, D. E. Larson, and M. P. Sherman. May 80, 28p
Contract AC04-76DP00789

The SHAFT 78 Code (multidimensional, two fluid phases, porous medium) has been used to begin assessment of the consequences of nuclear waste burial in a 1000-acre repository emplaced in argillite. The methodology used can well be applied to other argillaceous rocks as well as to hard rocks in general so long as their in-situ rock permeability can reasonably be assumed to be temperature- and stress-independent. The repository is assumed to contain spent fuel (SF) UO sub 2 at an initial power loading of 150 kW/acre and located at a depth of 600 m. It was found that with perfect backfill (permeabilty = 1 x 10 exp 7 darcy), a maximum fluid pressure of 770 bars existed in the repository at a time of 55 y after burial. Holding all other input variables constant, the maximum fluid pressure in the repository never exceeded the local lithostatic pressure when the permeability of the backfill material was increased to 1 x 10 exp -1 darcy. The calculated temperature histories are essentially independent of backfill permeability and porosity, indicating that heat transfer is conduction-dominated. (ERA citation 05:028493)

SAND-80-1319C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Sandia's Activities in Uranium Mill Tailings Remedial Action.
S. Neuhauser. 1980, 9p CONF-800584-1
Contract AC04-76DP00789
Fish and wildlife service workshop, Ft Collins, CO, USA, 28 May 1980.

The Uranium Mill Tailings Radiation Control Act of 1978 requires that remedial action be taken at over 20 inactive uranium mill tailings sites in the United States. Standards promulgated by the EPA under this act are to be the operative standards for this activity. Proposed standards must still undergo internal review, public comment, and receive Nuclear Regulatory Commission concurrence before being finalized. Briefly reviewed, the standards deal separately with new disposal sites (Part A) and cleanup of soil and contaminated structures at existing locations (Part B). In several cases, the present sites are felt to be too close to human habitations or to be otherwise unacceptably located. These tailings will probably be relocated. New disposal sites for relocated tailings must satisfy certain standards. The salient features of these standards are summarized. (ERA citation 05:028495)

SAND-80-1464 PC **A07**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Evaluation of Tuff as a Medium for a Nuclear Waste Repository: Interim Status Report on the Properties of Tuff.
J. K. Johnstone, and K. Wolfsberg. Jul 80, 139p
Contract AC04-76DP00789

This report is the second in a series of summary briefings to the National Academy of Science's (NAS) Committee on Radioactive Waste Management dealing with feasibility of disposal of heat-producing radioactive waste in silicic tuff. The interim status of studies of tuff properties determined on samples obtained from Yucca Mountain and Rainier Mesa (G-tunnel) located on the Nevada Test Site (NTS) are discussed. In particular, progress is described on resolving issues identified during the first briefing to the NAS which include behavior of water in tuff when heated, the effect of the presence or absence of water and joints on the thermal/physical properties of tuff and the detailed/complex sorptive properties of highly altered and unaltered tuff. Initial correlations of thermal/physical and sorptive properties with the highly variable porosity and mineralogy are described. Three in-situ, at-depth field experiments,

one nearly completed and two just getting underway are described. In particular, the current status of mineralogy and petrology, geochemistry, thermal and mechanical, radiation effects and water behavior studies are described. The goals and initial results of a Mine Design Working Group are discussed. Regional factors such as seismicity, volcanism and hydrology are not discussed. (ERA citation 05:028496)

SGAE-2875 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Department of Chemistry of the Oesterreichische Studiengesellschaft fuer Atomenergie GmbH.
E. Proksch. Jan 78, 7p CH-225/78
In German.
U.S. Sales Only.

The research and development work carried out is described. It is highly practice-oriented and a large fraction of the capacity available is devoted to projects sponsored by or carried out in collaboration with industry. The main R and D areas are high-temperature gas-cooled reactor fuel, conditioning of radioactive wastes, radiation processing, and production of radioisotopes and labeled compounds. (Atomindex citation 09:415108)

SGAE-2889 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Absorption Dose Rate in Great Bitumen Blocks. Experimental Detection.
P. Patek. Feb 78, 12p CH-228/78
In German.
U.S. Sales Only.

By mixing together glass dosemeters with a big amount of coated particles and irradiating these dosemeters for a certain time, it is possible to measure the dose rate inside this active material. These values are helpful in the decision on results of research work on bitumen-waste-mixtures for better interpretation, as well as for the determination of exact dose rate values by conditioning real waste. An arithmetic evaluation shows good agreement with the measured results. (Atomindex citation 11:509271)

SGAE-3038 PC **A03**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Separation, Conditioning, Storage and Disposal of Krypton-85.
P. Patek. Apr 79, 39p AV-1/79
In German.
U.S. Sales Only.

A review is given on the technical possibilities to remove the gaseous fission product exp 85 Kr from the off-gas streams of nuclear facilities, as reactors and reprocessing plants. The conditioning, storing and disposing methods are described. Safety considerations are showing, that it is not necessary to remove krypton from reactor off-gases, only at reprocessing plants it should be provided. For final disposal deep-sea-dumping is recommended, best in gas cylinders with pressure compensation. Also disposing in geological formations is possible, but only for pressureless conditioned products. (Atomindex citation 11:509272)

UCRL-15249 PC **A15**/MF **A01**
Camp Dresser and McKee, Inc., Champaign, IL. Water Resources Div.
Specifications for the Development of a Fully Three-Dimensional Numerical Groundwater Model for Regional Mass Transport of Radionuclides from a Deep Waste Repository.
T. A. Prickett. Apr 80, 326p
Contract W-7405-ENG-48

Specifications are given which are necessary to develop a three-dimensional numerical model capable of simulating regional mass transport of radionuclides from a deep waste repository. The model to be developed will include all of the significant mass transport processes including flow, chemical, and thermal advection, mechanical dispersion, molecular diffusion, ion exchange reactions, and radioactive decay. The model specifications also include that density and viscosity fluid properties be functions of pressure, temperature, and concentration and take into account fluid and geologic heterogenieties by allowing possible assignment of individual values to every block of the model. The model specifications furthermore include the repository shape, input/output information, boundary conditions, and the need for documentation and a user's manual. Model code validation can be accomplished with the included known analytical or laboratory solutions. It is recommended that an existing finite-difference model (developed by INTERCOMP and INTERA, Inc.) be used as a starting point either as an acceptable basic code for modification or as a pattern for the development of a completely different numerical scheme. A ten-step plan is given to outline the general procedure for development of the code. (ERA citation 05:028497)

UCRL-15250 PC **A07**/MF **A01**
Camp Dresser and McKee, Inc., Champaign, IL. Water Resources Div.
Conceptual Model for Regional Radionuclide Transport from a Salt Dome Repository: A Technical Memorandum.
R. S. Kier, P. A. Showalter, and M. D. Dettinger.
30 May 80, 146p
Contract W-7405-ENG-48

Disposal of high-level radioactive wastes is a major environmental problem influencing further development of nuclear energy in this country. Salt domes in the Gulf Coast Basin are being investigated as repository sites. A major concern is geologic and hydrologic stability of candidate domes and potential transport of radionuclides by groundwater to the biosphere prior to their degradation to harmless levels of activity. This report conceptualizes a regional geohydrologic model for transport of radionuclides from a salt dome repository. The model considers transport pathways and the physical and chemical changes that would occur through time prior to the radionuclides reaching the biosphere. Necessary, but unknown inputs to the regional model involve entry and movement of fluids through the repository dome and across the dome-country rock interface and the effect on the dome and surrounding strata of heat generated by the radioactive wastes. (ERA citation 05:028498)

UCRL-15253 PC **A15**/MF **A01**
TERA Advanced Services Corp., Berkeley, CA.
Transuranic Contaminated Waste Container Characterization and Data Base. Revision I.
B. G. Kniazewycz. May 80, 330p
Contract W-7405-ENG-48

The Nuclear Regulatory Commission (NRC) is developing regulations governing the management, handling and disposal of transuranium (TRU) radioisotope contaminated wastes as part of the NRC's overall waste management program. In the development of such regulations, numerous subtasks have been identified which require completion before meaningful regulations can be proposed, their impact evaluated and the regulations implemented. This report was prepared to assist in the development of the technical data base necessary to support rule-making actions dealing with TRU-contaminated wastes. An earlier report presented the waste sources, characteristics and inventory of both Department of Energy (DOE) generated and commercially generated TRU waste. In this report a wide variety of waste sources as well as a large TRU inventory were identified. The purpose of this report is to identify the different packaging systems used and proposed for TRU waste and to document their characteristics. This document then serves as part of the data base necessary to complete preparation and initiate implementation of TRU waste container and packaging standards and criteria suitable for inclusion in the present TRU waste management program. It is the purpose of this report to serve as a working document which will be used as appropriate in the TRU Waste Management Program. This report, and those following, will be compatible not only in format, but also in reference material and direction. (ERA citation 05:028476)

18H. Radioactivity

AD-A088 367/8 PC **A05**/MF **A01**
Atmospheric Science Associates Bedford MA
DELFIC: Department of Defense Fallout Prediction System. Volume I - Fundamentals.
Final rept. 16 Jan-31 Dec 79,
Hillyer G. Norment. 31 Dec 79, 99p DNA-5159F-1, AD-E300 885
Contract DNA001-76-C-0010
See also Volume 2, AD-A088 512.

DELFIC (Defense Land Fallout Interpretative Code) is intended for research in local nuclear fallout prediction and to serve as a standard against which predictions by less capable, production-oriented codes can be judged. By local fallout it means the intensely radioactive material which falls to the ground within several to several hundred miles of ground zero, depending on the size of the explosion. The code is essentially open-ended with regard to input data, it is highly flexible in that it offers many options that would not be available in a production-oriented code, and it strives to include as much of the physics of fallout transport and activity calculation, without resorting to short cuts, as is practicable.

AD-A088 512/9 PC **A11**/MF **A01**
Atmospheric Science Associates Bedford MA
DELFIC: Department of Defense Fallout Prediction System. Volume II. User's Manual.
Final rept. 16 Jan-31 Dec 79,
Hillyer G. Norment. 31 Dec 79, 234p DNA-5159F-2, AD-E300 869
Contract DNA001-76-C-0010
See also Volume 1, AD-A088 367.

DELFIC predicts local fallout from nuclear weapon explosions in the yield range from 0.001 to 100,000 KT over a range of heights of burst from shallow subsurface to fallout-safe airbursts. The code is designed for research use and to serve as a comparison standard for production-oriented codes. Code organization, data preparation and data input are described. Complete FORTRAN code listings are included.

KURRI-TR-165 PC **A04**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Measurements of Environmental gamma Rays.
Feb 78, 74p CONF-7608126-
In Japanese.Study meeting on radiation dose model calculations in multi-dimensional media, Kumatori, Osaka, Japan, 2 Aug 1976.
U.S. Sales Only.

Research works done in the covered period are described in individual short summaries; 74 items are presented. (Atomindex citation 09:412278)

KURRI-TR-166 PC **A04**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Measurements of Environmental gamma Rays.
Feb 78, 55p CONF-7608126-
In Japanese.Study meeting on radiation dose model calculations in multi-dimensional media, Kumatori, Osaka, Japan, 2 Aug 1976.
U.S. Sales Only.

Research works done in the covered period are described in individual short summaries; 55 items are presented. (Atomindex citation 09:412277)

KURRI-TR-167 PC **A05**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Measurements of Environmental gamma Rays.
Feb 78, 76p CONF-7608126-
In Japanese.Study meeting on radiation dose model calculations in multi-dimensional media, Kumatori, Osaka, Japan, 2 Aug 1976.
U.S. Sales Only.

Research works done in the covered period are described in individual short summaries; 76 items are presented. (Atomindex citation 09:412276)

KURRI-TR-168 PC **A04**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.

Measurements of Environmental gamma Rays.
Feb 78, 59p CONF-7608126-
In Japanese.Study meeting on radiation dose model calculations in multi-dimensional media, Kumatori, Osaka, Japan, 2 Aug 1976.
U.S. Sales Only.

Research works done in the covered period are described in individual short summaries; 59 items are presented. (Atomindex citation 09:412274)

KURRI-TR-169 PC **A05**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Measurements of Environmental gamma Rays.
Feb 78, 76p CONF-7608126-
In Japanese.Study meeting on radiation dose model calculations in multi-dimensional media, Kumatori, Osaka, Japan, 2 Aug 1976.
U.S. Sales Only.

Research works done in the covered period are described in individual short summaries; 76 items are presented. (Atomindex citation 09:412275)

KURRI-TR-170 PC **A04**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Measurements of Environmental gamma Rays.
Feb 78, 67p CONF-7608126-
In Japanese.Study meeting on radiation dose model calculations in multi-dimensional media, Kumatori, Osaka, Japan, 2 Aug 1976.
U.S. Sales Only.

Research works done in the covered period are described in individual short summaries; 67 items are presented. (Atomindex citation 09:412280)

KURRI-TR-171 PC **A04**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Measurements of Environmental gamma Rays.
Feb 78, 69p CONF-7608126-
In Japanese.Study meeting on radiation dose model calculations in multi-dimensional media, Kumatori, Osaka, Japan, 2 Aug 1976.
U.S. Sales Only.

Research works done in the covered period are described in individual short summaries; 69 items are presented. (Atomindex citation 09:412281)

KURRI-TR-172 PC **A04**/MF **A01**
Kyoto Univ., Kumatori, Osaka (Japan). Research Reactor Inst.
Measurements of Environmental gamma Rays.
Feb 78, 58p CONF-7608126-
In Japanese.Study meeting on radiation dose model calculations in multi-dimensional media, Kumatori, Osaka, Japan, 2 Aug 1976.
U.S. Sales Only.

Research works done in the covered period are described in individual short summaries; 58 items are presented. (Atomindex citation 09:412279)

NUREG/CR-1071 PC **A06**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Critical Experiments with Interstitially-Moderated Arrays of Low-Enriched Uranium Oxide. Topical Report on Reference Critical Experiments,
Robert E. Rothe, Inki Oh, and George R. Goebel. Sep 80, 117p RFP-3008

The critical separation between two tables supporting arrays of cans containing low-enriched uranium oxide has been measured for twenty-one (21) reflected configurations having interstitial layers of moderating material between cans. The critical separation varied between 0.23 and 1.84 cm. The uranium oxide (U3O8) is enriched to 4.46% 235U, compacted to a density of 4.7 g/cu cm, and adjusted to an H/U atomic ratio of 0.77 by the addition of water. Each can weighs 16 kg and is a 15.3 cm cube. Interstitial plastic moderator 1.0, 1.3, or 2.5 cm thick separates cans of the three-dimensional array. Some experiments include thin sheets of neutron absorbing materials, such as mild steel or polyvinyl chloride, surrounding each can.

18I. Reactor Engineering and Operation

AECL-5003/20 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
List of Publications, April 1977 to March 1978.
Apr 78, 38p
U.S. Sales Only.

AECL publications for the period April 1977 to March 1978 are arranged under 10 general subject headings and author and report number indexes are provided. (Atomindex citation 10:427579)

AECL-6207 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Ottawa (Ontario).
Annual Report, 1977-1978.
1978, 32p
U.S. Sales Only.

A financial statement and report of events in such areas as nuclear power projects, R and D, waste management, heavy water, and radiation equipment and radioisotopes, are presented for the fiscal year ending 1978 March 31. (Atomindex citation 10:427580)

BLG-520 PC **A09**/MF **A01**
Centre d'Etude de l'Energie Nucleaire, Mol (Belgium).
Annual Scientific Report 1976.
R. Billiau, F. Kirk, and J. Proost. 1977, 176p
U.S. Sales Only.

This report of the Centre d'Etude de l'Energie Nucleaire - Studiecentrum voor Kernenergie gives a survey of the scientific and technical work done in 1976. The research areas were as follows: 1. The sodium-cooled fast reactors and, in particular, mixed oxide fuels, carbide fuel, materials development, reprocessing, fast reactor physics, safety and instrumentation, and sodium technology. 2. The gas-cooled reactors as gas-cooled fast and high-temperature reactors. 3. The light water reactors, in particular, the BR3 reactor, light-water reactor fuels and pluutonium recycling. 4. Applied nuclear research, waste processing and disposal: safeguards, fusion research and lithium technology. 5. Basic and exploratory research in materials science and nuclear physics. 6. Non-nuclear research and development such as in air pollution, pollution abatement and waste handling, fuel cells and applied electrochemistry. (Atomindex citation 10:431155)

BMFT-FB-K-79-11 PC **A03**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Development of a Resistance Welding Technique for End Plugs of Fuel Rods.
H. Bezold, and R. Manzel. 1979, 43p
In German.
U.S. Sales Only.

In order to rationalize fuel rod production it appears necessary to switch over from the currently used WIG-welding method to a resistance welding method. Up to now more than 1000 MZFR fuel rods have been sealed by resistance welded end plugs. Neither the good strength of the welds nor the hydrogen pick-up has been reduced by irradiation. This has been established by post-irradiation examinations and corrosion. This positive behaviour has led to a further development of the method. The first LWR fuel rods with resistance welded end plugs have been manufactured for KWO. . (Atomindex citation 11:507904)

CEA-R-4991 PC **A16**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services d'Electronique.
Programming Language Study and an Implementation of a Simulation System with Formal Derivation. Application to Nuclear Reactors, Control Systems and Elecronic Networks.
These (D. es S.),
M. Nakhle. Jun 79, 358p
In French.
U.S. Sales Only.

Physical systems simulation requires a lot of information about the controlled process, and the mathematical approach must be appropriate. On the other hand, the parameters describing most systems components are nonlinear and time dependent. Moreover the differential equations describing them are 'stiff' equations of high order. The scope of the study is the description of the NEPTUNIX language and the differential equations. Most of the algorithms used, and the programs implementing these algorithms, are dealt with. Examples of nuclear reactors and mechanical processes simulation are investigated. NEPTUNIX handles a given mathematical description of a continuous system such as: f (x, x(.), t) = 0. Even more, symbolic derivation is performed automatically in order to compute the jacobian associated with the system, requisite for the numerical integration. So, for large systems the manual method for computer the jacobian and the classical method of differentiation are avoided, the former being tiresome and consuming of human time and the latter being costly in run time. The jacobian evaluated in this way is dealt with, by the approach of sparse matrices. Every element of this matrix is assigned a type attribute to improve time execution. Moreover, this is done only once, for a physical system which is described by a mathematical model which topology is invariant. The results of this process are sayed on a suitable device ready for performing repeated simulations. (Atomindex citation 11:509329)

CNEN-RT/FI-78-20 PC **A02**/MF **A01**
Comitato Nazionale per l'Energia Nucleare, Rome (Italy).
Neutron Flux Shape Effects in Large Fast Reactor Safety Calculations.
A. Galati, P. Loizzo, and A. Musco. 1978, 13p
U.S. Sales Only.

Three classes of accidents in a large fast reactor were studied by the two-dimensional core dynamics code NADYP-2. A modified version of the code, including a point kinetics module, allowed comparison between 2D and 0D power, reactivity and temperature histories. A strong shape effect was evidenced by these calculations in the boiling phase of LOF accidents as well as in the accident generated by control rod removal. Some future possibilities of by-passing the consequences of this effect are indicated. (Atomindex citation 11:497212)

CNEN-RT/ING-79-29 PC **A05**/MF **A01**
Comitato Nazionale per l'Energia Nucleare, Rome (Italy).
Fluid Velocity in Outer Channels of Tube Bundle of PGV-1 Steam Generator Prototype.
C. Salgo, E. Lorenzini, and M. Spiga. 1979, 83p
In Italian.
U.S. Sales Only.

This paper deals with the determination of the fluid velocity and pressure in every channel outside the tube bundle of the prototype model of the steam generator PGV-1, designed jointly by CNEN and NIRA. The results are obtained by the numerical solution of a system of algebraic and differential equations deduced by a mathematical "channel" model. Such results agree with the experiments performed on a model of the prototype PGV-1 by Alsthom Technique des Fluides. (Atomindex citation 11:508609)

CNEN-RT/ING-79-38 PC **A03**/MF **A01**
Comitato Nazionale per l'Energia Nucleare, Rome (Italy).
Discussion and Interpretation of a Fast Reactor Model Explosive Test with a Thin Wall Vessel.
A. Daneri, G. Toselli, T. Trombetti, and S. Curioni. 1979, 30p
U.S. Sales Only.

This paper analyzes the capability of a lagrangian fluid-elastic-plastic-dynamics computational method to answer the physical problems of propagation of pressure waves, energy transmission and elastic-plastic deformation in the course of a simulated hypothetical accident in a simplified fast reactor model with a thin wall vessel. On the basis of the experimental data available a physical picture of the mode and effects of energy propagation throughout the system is given, and their interpretation by the computational method is discussed. (Atomindex citation 11:508364)

CONF-800607-36 PC A02/MF A01
Oak Ridge National Lab., TN.
Void Coefficient in a Unit Cell for U-Pu Water Breeder Reactors.
Y. Ronen, M. Cojocaru, and A. Radkowsky. 1980, 7p
Contract W-7405-ENG-26
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

The possibility of breeding with the Pu-U fuel cycle in light or heavy water has been established. For such lattices the void coefficient in a unit cell was calculated. It was found that for light water lattices the void coefficient is negative whereas for heavy water lattices the void coefficient is positive. However, it was shown that by introducing a relatively small amount of light water to the heavy water, a negative void coefficient is obtained while retaining many of the heavy water lattice properties. The results of an investigation of the value of the void coefficient during burnup in a unit cell of the heavy/light water lattices was investigated and the results are presented. (ERA citation 05:029022)

CONF-800607-45 PC A02/MF A01
Oak Ridge National Lab., TN.
S/Sub n/ Transport Calculations of the PCA Experiments with Some Estimated Uncertainties.
R. E. Maerker. 1980, 6p
Contract W-7405-ENG-26
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Detailed flux calculations have been carried out for both the 8/7 and 12/13 configurations involving the Pool Critical Assembly (PCA) at Oak Ridge. In addition, estimates of uncertainties in the calculations arising from both methods approximations and input data uncertainties for two important detector locations in the 8/7 configuration have been made. (ERA citation 05:029064)

CONF-800607-48 PC A02/MF A01
Oak Ridge National Lab., TN.
Appliction of Sensitivity Theory for Extrema of Functionals to a Transient Reactor Thermal-Hydraulics Problem.
D. G. Cacuci, and C. F. Weber. 1980, 8p
Contract W-7405-ENG-26
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

A generalized sensitivity theory based on adjoint functions has been recently developed for systems governed by coupled nonlinear equations and nonlinear responses, and has been successfully applied to several reactor thermal-hydraulics sample problems. This theory has now been significantly extended to include treatment of a new class of responses which are extrema (in phase-space variables) of functionals of the system's state vector and input parameters. Examples of such responses - of great interest in reactor safety and design - are the maximum clad and maximum fuel temperatures. A practical application of this theory is presented. (ERA citation 05:029080)

CONF-800607-51 PC A02/MF A01
Oak Ridge National Lab., TN.
Determination of Incipient Boiling Propagation from Tests in a Simulated LMFBR Assembly.
G. A. Klein, and K. Haga. 1980, 5p
Contract W-7405-ENG-26
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Two-dimensional boiling effects may significantly influence the course of LOPI and LSHRS hypothetical accident sequences. Boiling models are being developed at ANL and MIT to investigate conditions under which these two-dimensional effects are important. A thermocouple correlation technique has been developed at ORNL to track the void growth in sodium tests run in the Thermal-Hydraulic Out-of-Reactor Safety (THORS) facility. This information can be used to aid in the development and verification of the constitutive relations required by the multi-dimensional codes. (ERA citation 05:029081)

CONF-800607-57 PC A02/MF A01
Tennessee Univ., Knoxville.
Implementation of Generalized Perturbation Theory Into the 3-D Nodal Code SIMULATE.
S. M. Bowman, M. L. Williams, and H. L. Dodds. 1980, 7p
Contract W-7405-ENG-26
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Determining the effects of changes in design and data parameters upon reactor performance can be very expensive when many perturbations must be considered for a complex system. In order to substantially reduce the cost involved in calculations such as these, generalized perturbation theory (GPT) capability has been implemented into the 3-D LWR nodal reactor analysis code SIMULATE. This capability makes 3-D sensitivity analysis of a realistic LWR practical for the first time. Applications to design analysis will be discussed. (ERA citation 05:029023)

CONF-800723-15 PC A03/MF A01
EG and G Idaho, Inc., Idaho Falls.
Improved Guidelines for RELAP4/MOD6 Reflood Calculations.
T. H. Chen, and C. D. Fletcher. 1980, 33p
Contract EY-76-C-07-1570
19. national heat transfer conference, Orlando, FL, USA, 27 Jul 1980.

Computer simulations were performed for an extensive selection of forced- and gravity-feed reflood experiments. This effort was a portion of the assessment procedure for the RELAP4/MOD6 thermal hydraulic computer code. A common set of guidelines, based on recommendations from the code developers, was used in determining the model and user-selected input options for each calculation. The comparison of code-calculated and experimental data was then used to assess the capability of the RELAP4/MOD6 code to model the reflood phenomena. As a result of the assessment, the guidelines for determining the user-selected input options were improved. (ERA citation 05:029083)

CONF-800723-16 PC A03/MF A01
Idaho National Engineering Lab., Idaho Falls.
Analysis of Molten Debris Freezing and Wall Erosion During a Severe RIA Test.
M. S. El-Genk, and R. L. Moore. 1980, 33p
Contract AC07-76ID01570
19. national heat transfer conference, Orlando, FL, USA, 27 Jul 1980.

A one-dimensional physical model was developed to study the transient freezing of the molten debris layer (a mixture of UO sub 2 fuel and zircaloy cladding) produced in a severe reactivity initiated accident in-pile test and deposited on the inner surface of the test shroud wall. The wall had a finite thickness and was cooled along its outer surface by coolant bypass flow. Analyzed are the effects of debris temperature, radiation cooling at the debris layer surface, zircaloy volume ratio within the debris, and initial wall temperature on the transient freezing of the debris layer and the potential melting of the wall. The governing equations of this two-component, simultaneous freezing and melting problem in a finite geometry were solved using a one-dimensional finite element code based on the method of weighted residuals. (ERA citation 05:029084)

CONF-800723-7 PC A03/MF A01
Idaho National Engineering Lab., Idaho Falls.
Comparison of Measured and Calculated LWR Fuel Behavior During a Hypothetical Reactivity Initiated Accident.
S. K. Fukuda, P. E. MacDonald, and R. W. Garner. 1980, 37p
Contract AC07-76ID01570
19. national heat transfer conference, Orlando, FL, USA, 27 Jul 1980.

Comparisons of measured and calculated LWR fuel rod responses during a reactivity initiated accident test are presented. The results indicate that the computer code, FRAP-T5, adequately calculates the fuel rod behavior up to the time at which the gap closes and provides a good thermal solution up to the time of gross fuel and cladding relocation. Three areas have been identified for further model development: (a) development of a fuel swelling model for near molten fuel temperatures; (b) incorporation of a deformable fuel pellet model that is applicable for the closed gap, high strain rate regime; and (c) expansion of the failure stress data base to include heat-up rates of up to 5000 K/s. (ERA citation 05:029082)

CONF-800804-3 PC A03/MF A01
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div.
Design and Testing of CRBRP Insulated Horizontal and Vertical Pipe Clamps.
L. P. Poliono, and R. M. Mello. 1980, 40p
Contract AC15-76CL02395
ASME century 2 emerging technology conference, San Francisco, CA, USA, 10 Aug 1980.

The Clinch River Breeder Reactor Plant (CRBRP) Primary Heat Transport system piping may be characterized as large-diameter, thin-wall piping which transports liquid sodium at high temperatures. The piping is arranged in accord with the elevated loop concept, consisting of large horizontal inplane, expansion loops and long, vertical runs of piping. These characteristics and the postulated thermal transient and seismic loads, which are imposed on the piping, dictate pipe clamp designs that are substantially different from standard off the shelf pipe clamp designs. The design features of the CRBRP horizontal and vertical pipe clamps for the large sodium piping, the various test programs used to verify the clamp designs, and the results of this testing are presented. (ERA citation 05:028976)

CONF-800804-7 PC A03/MF A01
Idaho National Engineering Lab., Idaho Falls.
Centrifugal Pump Performance under Simulated Two-Phase Flow Conditions.
T. H. Chen, and W. J. Quapp. 1980, 28p
Contract AC07-76ID01570
ASME century 2 emerging technology conference, San Francisco, CA, USA, 10 Aug 1980.

Test results are presented from centrifugal (mixed-flow) pump performance testing conducted at the Idaho National Engineering Laboratory (INEL) using nitrogen-water flow to simulate steam-water two-phase conditions. The results are compared with the predictions of the RELAP4/MOD6 pump performance model which is based on experimental data obtained from tests conducted on a small (radial-flow) pump in the Semiscale facility. The purpose of this investigation is to obtain the two-phase characteristics of a mixed-flow pump and evaluate the prediction capability of the pump model commonly used to analyze the thermal-hydraulic response when applied to a postulated loss-of-coolant accident in a light water reactor. (ERA citation 05:029085)

COO-2985-23 PC A04/MF A01
General Electric Co., Pleasanton, CA. Vallecitos Nuclear Center.
Dilute Chemical Decontamination Program. Quarterly Report 2, January-March 1978.
L. D. Anstine. Jun 78, 53p NEDC-12705-2
Contract AC02-76ET34203

Effects of reagent concentration, pH, temperature, and reducing agents on the dissolution rate of BWR out-of-core oxide films in the three candidate reagents were evaluated. Preliminary dissolution tests with BWR fuel deposits indicate that 0.01 M EDTA, NTA, and citric acid with 0.01 M ascorbic acid are capable of dissolving greater than 70% of the oxide film in less than 10 hours. The rate in 0.01 M oxalic acid is slightly slower. Equilibria for the distribution of Fe exp +3, Fe exp +2, and Co exp +2 between solutions of oxalic acid, EDTA, and NTA, and cation and anion resins indicate that oxalic acid and NTA systems can be regenerated; while EDTA systems cannot be regenerated. Ferric ion significantly reduces the adsorption rate of all reagents. The adsorption rate for the EDTA and oxalate complexes can be accelerated by decreasing the ratio of cation to anion resin. It appears that the oxalate system will require the smallest quantity of resin for total removal, with the NTA and EDTA systems requiring 30 to 60% more resin. The crystal structure of the Brunswick-2 and Monticello fuel deposits was essentially 100% alpha Fe sub 2 O sub 3. The fuel deposits from Brunswick-2 and Monticello were determined to consist of particles of two different sizes. The preliminary Dresden-2 materials survey of the reactor

pressure vessel and recirculation system was completed. This survey was utilized to prepare the materials list for the corrosion test plan. 28 figures, 7 tables. (ERA citation 05:030622)

CTA-EAV-22/78 PC **A03**/MF **A01**
Centro Tecnico Aeroespacial, Sao Jose dos Campos (Brazil). Inst. de Atividades Espaciais.
Transient Neutrons Flux Behaviour in a Spherical Reactor Core.
A. W. A. de Souza. Nov 78, 43p
In Portuguese.
U.S. Sales Only.

This work studies the transient neutron flux in a fast reactor of spherical geometry. The burning of U exp 235 nuclei is equated and two kinds of reflector were studied. The numeric solutions are then compared with the results for those reflectors. (Atomindex citation 11:497184)

DLCS-5000180 PC **A03**/MF **A01**
Duquesne Light Co., Shippingport, PA.
(Shippingport Atomic Power Station). Quarterly Operating Report, First Quarter 1980.
1980, 30p
Contract AC11-76PN00292

At the beginning of the first quarter of 1980, the Shippingport Atomic Power Station was operating with the 1A, 1B, 1C, and 1D reactor coolant loops and the 1AC and 1BD purification loops in service. During the quarter, the Station was operated for the Duquesne Light Company System in the base mode operation. No swing load operations were conducted this quarter; however, several 15% reactor power cycles were performed for training. The LWBR core has generated 15,129.91 EFPH from startup through the end of the quarter. (ERA citation 05:030630)

DOE/CEA/BMFT-15 PC **A04**/MF **A01**
Internationale Atomreaktorbau G.m.b.H., Bergisch Gladbach (Germany, F.R.).
Debene Sodium Test Facility Profiles.
Oct 79, 56p
Work performed under United States-CEA/BMFT Fast Reactor Exchange Program.
U.S. Sales Only.

The facilities for component testing in sodium at INTERATOM and the Netherlands are described. (ERA citation 05:030646)

DOE-tr-117 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Radiochemie.
Development of Analytical Techniques for Aerosol and Fission Products Release from Hot and Boiling Sodium Pools.
E. Mainka, W. Coerdt, M. Hartmann, and H. G. Mueller. Aug 79, 22p
C KFK--2569, March 1978.Work performed under United States-W. Germany Fast Reactor Exchange Program.
U.S. Sales Only.

A method of sodium determination was developed which is simple, fast, and easily automated. It was further shown that the techniques of OH, CO sub 2 , and HCO sub 3 analysis used in water technology are equally applicable to the problem treated here. An analytical technique based on atomic absorption spectrometry was developed allowing monitoring of fission products released. Random samples taken in the Cs determination by activation analysis and in the Sr determination using x-ray fluorescence spectroscopy were compared. The capabilities of the method used were demonstrated for these fission products. (ERA citation 05:030654)

DOE-tr-123 PC **A06**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
Detection of Band-Limited Components in Noise Signals by Surveillance of the Auto- and Cross-Power Spectral Density.
J. Ehrhardt. Sep 79, 114p
C KFK--2559, March 1978.Work performed under United States-W. Germany Fast Reactor Exchange Program.
U.S. Sales Only.

In technical plants disturbances are possible which generate small narrow-band components in the measured signals. For the detection of these oscillatory signals the observation of the frequency spectra of the measured signals' noise components is particularly advantageous because they produce additional characteristic peaks. in this paper detection systems for the fast detection of suddenly appearing peaks in the power spectral density of noise signals are presented based on auto- and cross-correlation techniques. General criteria were developed to enable the determination of the optimal detection system and its sensitivity for the different problems. Specially auto- and cross-correlation measurements were compared in dependence on the signal coherence. (ERA citation 05:028982)

DOE-tr-124 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung.
Creep and Stress-Rupture Behavior of Internally Pressurized Tubes Made from Austenitic Stainless Steel X10 NiCrMoTiB 15 15 (Material No. 1.4970, Melt 8-22075).
L. Schaefer, F. Polifka, and H. Kempe. 47p
C KFK--2543, April 1978.Work performed under United States-W. Germany Fast Reactor Exchange Program.
U.S. Sales Only.

Creep and stress-rupture tests have been performed at 600, 650, 700, and 750 exp 0 C on tubes with two different thermal-mechanical treatments made from the austenitic stainless steel X10 NiCrMoTiB 15 15 (Material-No. 1.4970, Chg. 8-22075). The tubes with the SNR 300, MK-II dimensions were loaded by internal pressure, and the creep strain was measured continuously. The results are presented in form of creep curves, stress-time-to-rupture curves, and curves for a creep limit. The average and minimum creep rates as a function of the applied stress have been evaluated and are described with a creep law analogous to Norton's creep law. (ERA citation 05:030642)

DOE-tr-156 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
Heat Transfer Measurements in Internally Heated Fluids in Cylindrical Convection Cells.
G. Fieg. Aug 79, 29p
C KFK--2712, October 1978.Work performed under United States-W. Germany Fast Reactor Exchange Program.
U.S. Sales Only.

Model experiments have been performed to study the stationary, natural convection heat transfer of internally heated fluids in cylindrical convection cells. The influence of geometry (aspect ratio) as well as of different thermal wall conditions on to the heat transport characteristics have been investigated. The aim of these model experiments is the verification of thermohydraulic codes for PAHR studies; therefore, the temperature and velocity fields in the convecting fluids have also been measured. The results of these experiments are compared, as far as possible, with existing thermohydraulic codes and simpler model assumptions like the zone-model of Baker et al. These theoretical models can, after experimental verification, be used to study realistic PAHR situations. (ERA citation 05:030715)

DR-GSTS-01/78 PC **A06**/MF **A01**
Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro. Dept. de Reatores.
Utilization of the RELAP 4 Program (Part 1). Basic Case Double Ended Cold Leg Break (DECLB).
D. E. da Silva, J. M. de Lima, V. G. Rodrigues, J. R. Costa, and H. Austregesilo Filho. Dec 78, 110p
In Portuguese.
U.S. Sales Only.

The use of the RELAP 4 program in the analysis of loss-of-coolant accidents after a double-ended break localized between the main coolant pump and the pressure vessel is presented. (Atomindex citation 11:496861)

DR-GSTS-02/78 PC **A11**/MF **A01**
Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro. Dept. de Reatores.
Thermohydraulic Behaviour of the Hot Channel in a PWR Type Reactor under Loss-of-Coolant Accident Conditions (LOCA).
Tese (M.Sc.),
J. R. Costa. Dec 78, 246p
In Portuguese.
U.S. Sales Only.

An analysis is done of the core behavior for a 1861 MW(th) pressurized water reactor with two coolant loops, during the blowdown phase of a double-ended cold leg rupture, between the main feedwater pump, and the pressure vessel. The analysis is done through a detailed thermohydraulic study of the hot pin channel with RELAP4/MOD 5 code, including the Evaluatin Model options. The problem is solved separately for two values of discharge coefficient (C sub(D)= 1,0 and 0,4). The results show that the maximum clad temperature is lower than the limit value for licensing purposes. Concerning clad material oxidation, the maximum value obtained is also under the limit of acceptance. (Atomindex citation 11:496844)

DR-GSTS-03/78 PC **A05**/MF **A01**
Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro. Dept. de Reatores.
Utilization of the RELAP 4 Program. II. Thermohydraulic Analysis in the Hot Channel - Double Ended Cold Leg Break (DECLB).
J. R. Costa. Dec 78, 93p
In Portuguese.
U.S. Sales Only.

It is shown the procedure used in the thermohydraulic analysis of the hot channel of a 1876 MW sub(t) PWR reactor (Angra I) under the effects of a loss-of-coolant accident of the double-ended break type, localized between the main pump and the pressure vessel. (Atomindex citation 11:496845)

EGG-LO-87-80-130 PC **A03**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Special LOFT Features for Improved Monitoring and Survival of LOCA Transients.
L. D. Goodrich, L. P. Leach, T. B. Klingler, J. C. Morrow, and W. C. Phoenix. 7 Jan 80, 48p
Contract AC07-76ID01570

LOFT is designed to monitor and survive Loss-Of-Coolant-Accidents (LOCAs). This report presents the primary design difference from LPWRs that were required to accomplish this. These design differences may be of interest to the nuclear power generator industry. This report should be revised semi-annually or as developments in the LOFT Program require. (ERA citation 05:029087)

EML-376 PC **A06**/MF **A01**
Department of Energy, New York. Environmental Measurements Lab.
Spectrometric Measurements within the Containments of 8 PWRs: A Data Compilation.
R. S. Sanna, F. Hajnal, J. E. McLaughlin, and R. M. Ryan. Jul 80, 121p

Measurements were made with the multisphere spectrometer to characterize the neutron environment inside the containment of pressureized water power reactors. Differential energy spectra and integral quantities of interest such as the neutron fluence rate and dose equivalent rate were determined. Available energy response data of several neutron monitors were applied to the spectra to predict the performance of these monitors in a PWR environment. Detailed data for each measurement are presented. Summaries of the results along with a discussion of the measurement and analytical techniques used are presented separately. (ERA citation 05:028954)

EPRI-NP-1407 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Development of Ultrasonic Tomography for Residual Stress Mapping. Final Report.
A. J. Boland, T. J. Davis, S. R. Doctor, T. P. Harrington, and B. P. Hildebrand. May 80, 82p
Contract AC06-76RL01830

The volumetric stress distribution in nuclear reactor piping and pressure vessels is becoming an in-

creasingly important parameter in nondestructive evaluation. This report describes research and development of instrumentation leading toward a means of measuring subsurface stress distributions in metals. Based on the principles of Computerized Tomography (CT), an ultrasonic tomographic instrument system has been developed. The microprocessor-based system uses an ultrasonic linear array to acquire time-of-flight data to an accuracy of 0.5 to 1.0 ns. The data is processed using a modified ART (Algebraic Reconstruction Technique) program. A two-dimensional map of the velocity distribution is displayed on a monitor. The velocity distribution is interpreted or calibrated in terms of stress through the acousto-elastic coefficients. (ERA citation 05:029045)

FEI-840 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Electromagnetic (Eddy-Current) Technique for Void Fraction Control in a Flows of Liquid Metal Coolant.
V. N. Tipikin, and V. V. Leshkov. 1979, 28p
In Russian.
U.S. Sales Only.

Presented is a short theory of electromagnetic (eddy-current) technique for continuinity control of liquid metal coolants flows and the principle of the operation of devices based on the technique. A considerable attention is paid to the problems of the temperature compensation of an error while working at elevated temperatures (300-500 deg C). The developed sensors with thermocompensation, measuring schemes and serial devices applied are described. It is shown that the eddy-current technique is of high sensitivity of the order of the tenth parts of gas volume per cent in the cavity of a measuring coil. (Atomindex citation 11:497172)

FRNC-TH-855 PC **A11**/MF **A01**
Paris-11 Univ., Orsay (France).
Analysis of Reactivity Coefficients Measured in Fast Critical Assemblies. Application to Fissile Elements in Masurca.
J. Rapenne. 1973, 245p
In French.Thesis.
U.S. Sales Only.

A simple, fast and sufficiently accurate method to interpret measurements of reactivity effects from sample oscillations is defined. This first-order perturbation method, based on the collision probability theory, accounts for the position of the sample in the cell and for the flux perturbation due to the sample and to its self-shielding. The method has been applied to a set of reactivity experiments carried out on a series of Pu or U cores in the Masurca, Sneak and Hermine assemblies; these provided basic information, especially on the capture cross-sections of Pu-239, U-238, higher isotopes of Pu and structural materials. (Atomindex citation 11:508908)

FRNC-TH-865 PC **A13**/MF **A01**
Lyon-1 Univ. (France).
Three-Dimensional Model of the Thermo-Hydrodynamic Neutron Interaction in the Core of Water Reactors (Stationary States).
V. Mastrangelo. 1977, 276p
In French.Thesis.
U.S. Sales Only.

A thermo-hydrodynamic neutron interaction model for permanent working conditions is developed in the case of closed circuits (boiling water reactors) and open circuits (pressurized water reactors). Two numerical convergence acceleration methods are then worked out for the resolution of linear problems by successive iterations. A physical study is devoted to the convergence of the thermo-hydrodynamic neutron interaction process. The model developed is applied to the calculation of the power distribution for the core of a 980 MWe BWR-6 type boiling water power station and to the study of normal and accidental working configurations of the pressurized water core of a 900 MWe PWR-CP1 unit. (Atomindex citation 11:514211)

GA-A-15439 PC **A08**/MF **A01**
General Atomic Co., San Diego, CA.
Licensing Topical Report: The Measurement and Modelling of Time-Dependent Fission Product Release from Failed HTGR Fuel Particles under Accident Conditions.
B. F. Myers, and R. E. Morrissey. Apr 80, 153p
Contract AT03-76ET35300

The release of fission products from failed fuel particles was measured under simulated accident (core heatup) conditions. A generic model and specific model parameters that describe delayed fission product release from the kernels of failed HTGR fuel particles were developed from the experimental results. The release of fission products was measured from laser-failed BISO ThO sub 2 and highly enriched (HEU) TRISO UC sub 2 particles that had been irradiated to a range of kernel burnups. The burnups were 0.25, 1.4, and 15.7% FIMA for ThO sub 2 particles and 23.5 and 74% FIMA for UC sub 2 particles. The fission products measured were nuclides of xenon, iodine, krypton, tellurium, and cesium. (ERA citation 05:029088)

GRS-F-82 PC **A09**/MF **A01**
Gesellschaft fuer Reaktorsicherheit m.b.H., Cologne (Germany, F.R.).
Reports on Research Projects in the Field of Reactor Safety Sponsored by the Federal Ministry for Research and Technology. Progress Report. Reporting Period April 1 - June 30, 1979.
Sep 79, 192p
In German.
U.S. Sales Only.

Investigations on the safety of Light Water Reactors (LWR) being performed in the framework of the Research Program Reactor Safety (RS - Projects) are sponsored by the BMFT (Federal Minister for Research and Technology), Bundesminister fuer Forschung und Technologie. Objective of this program is to investigate in greater detail the safety margins of nuclear power-plants and their systems and the further development of safety technology. Besides the investigations of LWR tasks first projects on the safety of FBR type reactors are sponsored by the BMFT. The GRS (Reactor Safety Association), Gesellschaft fuer Reaktorsicherheit mbH, by order of the BMFT, informs continuously of the status of such investigations by means of quarterly and annually publication of progress reports within the series GRS - F - Fortschrittsberichte (GRS - F - Progress Reports). Each progress report represents a compilation of individual reports about objectives, the work performed, the results, the next steps of the work etc. The individual reports are prepared in a standard form by the contractors themselves as a documentation of their progress in work. The individual reports are arranged according to the amended LWR Safety Research Program of the BMFT in the near future. Another table contents uses the same classification system as applied in the Nuclear Safety Index of the CEC Communities and the OECD. (Atomindex citation 11:508367)

GRS-11 PC **A02**/MF **A01**
Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Koeln (Germany, F.R.).
Realization of Legal Protection Requirements with the Aid of Models of Nuclear Facilities.
D. W. Wildberg, and H. J. Herrmann. Aug 78, 25p
In German.
U.S. Sales Only.

In the Federal Republic of Germany, the model-based planning, construction and operation of nuclear facilities is still in its initial stages. Based on a few examples, the authors show that with the atomic energy legislature and with the laws in the conventional sector, the legislator had enacted requirements at a relatively early stage for the protection of the individual person in the facility and for the population at large in the vicinity of the facility. However, in the realization of these protection requirements, there are still problems, and these are often very basic in nature. The best solution here seems to be to tackle the problems with the help of models. This would permit subjects like serviceability, testability, use of external personnel, spatial distribution of redundancies, rescue of injured persons, fire protection measures, physical protection and the dismantling of facilities, which are multifarious in nature and have overlapping requirements, to be presented and discussed in greater depth and detail. The positive aspects of the use of models are presented, and the advantages and disadvantages of models are discussed in detail. Finally, the variety of models, which can ben used during the different phases of a nuclear facility, are discussed, and some remarks are made regarding the costs of models. One section of the report deals with examples of the practical use of models: Models have proved themselves in the past in the construction of refineries and chemical plants, and have successfully demonstrated their suitability in the field of nuclear technology. The examples of these need not be limited to those in the Federal Republic of Germany. (orig.) 891 HP. (Atomindex citation 10:434003)

HEDL-SA-1966-FP PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Sodium Loop Safety Facility W-2 Experiment Fuel Pin Rupture Detection System.
M. A. Hoffman, T. L. Kirchner, and S. C. Meyers. May 80, 28p CONF-800607-67
Contract AC14-76FF02170
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

The objective of the Sodium Loop Safety Facility (SLSF) W-2 experiment is to characterize the combined effects of a preconditioned full-length fuel column and slow transient overpower (TOP) conditions on breeder reactor (BR) fuel pin cladding failures. The W-2 experiment will meet this objective by providing data in two technological areas: (1) time and location of cladding failure, and (2) early post-failure test fuel behavior. The test involves a seven pin, prototypic full-length fast test reactor (FTR) fuel pin bundle which will be subjected to a simulated unprotected 5 cents/s reactivity transient overpower event. The outer six pins will provide the necessary prototypic thermal-hydraulic environment for the center pin. (ERA citation 05:029089)

HEDL-SA-2015-FP PC **A04**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
W-1 Sodium Loop Safety Facility Experiment Centerline Fuel Thermocouple Performance.
S. C. Meyers, and J. M. Henderson. May 80, 51p CONF-800607-65
Contract AC14-76FF02170
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

The W-1 Sodium Loop Safety Facility (SLSF) experiment is the fifth in a series of experiments sponsored by the Department of Energy (DOE) as part of the National Fast Breeder Reactor (FBR) Safety Assurance Program. The experiments are being conducted under the direction of Argonne National Laboratory (ANL) and Hanford Engineering Development Laboratory (HEDL). The irradiation phase of the W-1 SLSF experiment was conducted between May 27 and July 20, 1979, and terminated with incipient fuel pin cladding failure during the final boiling transient. Experimental hardware and facility performed as designed, allowing completion of all planned tests and test objectives. This paper focuses on high temperature in-fuel thermocouples and discusses their development, fabrication, and performance in the W-1 experiment. (ERA citation 05:029090)

HEDL-SA-2032-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
FFTF Heat Transport System (HTS) Component and System Design.
M. W. Young, and P. A. Edwards. 1980, 6p CONF-800607-71
Contract AC14-76FF02170
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

The FFTF Heat Transport Systems and Components designs have been completed and successfully tested at isothermal conditions up to 427 exp 0 C (800 exp 0 F). General performance has been as predicted in the design analyses. Operational flexibility and reliability have been outstanding throughout the test program. The components and systems have been demonstrated ready to support reactor powered operation testing planned later in 1980. (ERA citation 05:030682)

IAEA-R-1559-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Development of NDA Techniques for the Uranium-Thorium Fuel Cycle. Final Report for the Period 15 January 1974 - 14 December 1977.
R. Hecker. May 78, 11p
U.S. Sales Only.

The main purpose of the Contract was the development of non-destructive assay (NDA) techniques and selection of methods for safeguarding the HTGR uranium-thorium fuel cycle. The following methods and techniques were developed and used for both AVR and HTR-type of fuel: the intrinsic radiation method for fresh fuel provided the accuracy of U-235 content determination better than 2% and for Th-232 better than 5%. Four Ge-Li detectors were used simultaneously to provide better sensitivity; the method of isotopic correlation was realized by using the high resolution gamma spectroscopy. The correlations between the yields of several fission products - such as Cs-137, Cs-134, Eu-154 and burn-up values were established and used for spent fuel measurements; the total amount of fissile material in HTGR spent fuel was measured by using active neutron interrogation with Sb-Be low energy neutrons and (D,T) pulsed neutron source. The characteristics of the Selective Neutron Transport Method were found to be quite reasonable, because the contribution of Sb-Be neutron source to counting rate corresponded to only 4mg U-235 and the statistical error was less than 1% for 1g U-235 and 1000sec measuring time. The use of the second method of delayed neutrons detection allowed 32 pebbles to be irradiated simultaneously. The background was found to be equivalent to less than 50mg U-235. (Atomindex citation 11:509316)

IAEA-R-1733-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Investigation of Techniques for the Application of Safeguards to a Continuously Fuelled Reactor. Final Report for the Period 1 December 1975 - 30 September 1977.
J. G. Hodgkinson, and D. A. Head. Mar 78, 10p
U.S. Sales Only.

The following three areas of prime safeguards concern are analyzed: 1) at the reactor face, where spent fuel is first removed from the channel, 2) along the system for transporting spent fuel from the reactor to the storage bay, and 3) in the spent fuel storage bay. The program is designed to develop techniques and instruments to safeguard these areas. (Atomindex citation 11:509317)

IKE-2-48 PC **A08**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Fragmentation of Low-Melting Metals by Collapsing Steam Bubbles.
Diss. (D.Eng.),
R. Benz. Aug 79, 162p
In German.
U.S. Sales Only.

When a hot melt meets a vaporable liquid of lower temperature, explosive vaporisation of the cooler liquid may be the result. This is called a steam explosion if a substantial amount of thermal energy is converted into mechanical energy. One important step in understanding about steam explosions is to explain the surface increase of the hot melt. There are several competing fragmentation hypotheses, but so far there has been no model to describe fragmentation criteria as well as the time curve of surface increase on the basis of physical processes. An overall model is now given for one of the possible fragmentation mechanisms, i.e. the division of the melt by collapsing steam bubbles. The model estimates the surface increase of the melt on the basis of heavy supercooled boiling, the heat transfer connected with it, the transfer of mechanical energy during steam bubble collapse, and the solidification of the melt. The results of the calculations have shown that basic experimental observations, e.g. time and extent of fragmentation, are well presented in the model with regard to their order of magnitude. The model presents a qualitatively correct description of the effects of important influencing factors, e.g. supercooling of the coolant or initial temperature of the melt. (Atomindex citation 11:508357)

INIS-mf-4144 PC **A04**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Risoe 1976/77. Annual Report of the Risoe National Laboratory for the Period 1 April 1976 to 31 March 1977.
1977, 72p
U.S. Sales Only.

A summary of the chief activities of the Risoe National Laboratory is given. The material is presented in a revised sequence following upon changes in the organization of the work at Risoe. These changes partly reflect the widened scope of activities, which now include non-nuclear energy research, that resulted from the Act on Energy Policy Measures from April 1976. The sequence is: reactor technology and safety, nuclear fuel cycle, environmental and safety research, materials research, radiation technology, agricultural research, other energy research, research facilities and auxiliary services. For more detailed descriptions of the work in progress, readers are referred to the annual reports of the various departments, and to the two series of research reports as well as to articles appearing in scientific journals. A list of these publications is given. Design data on research facilities are presented. (Atomindex citation 09:376880)

INIS-mf-4145 PC **A04**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Risoe 1976/77. Annual Report of the Risoe National Laboratory for the Period 1 April 1976 to 31 March 1977.
1977, 56p
In Danish.
U.S. Sales Only.

A summary of the chief activities of the Risoe National Laboratory is given. The material is presented in a revised sequence following upon changes in the organization of the work at Risoe. These changes partly reflect the widened scope of activities, which now include non-nuclear energy research, that resulted from the Act on Energy Policy Measures from April 1976. The sequence is: reactor technology and safety, nuclear fuel cycle, environmental and safety research, materials research, radiation technology, agricultural research, other energy research, research facilities and auxiliary services. For more detailed descriptions of the work in progress, readers are referred to the annual reports of the various departments, and to the two series of research reports as well as to articles appearing in scientific journals. A list of these publications is given. Design data on research facilities are presented. (Atomindex citation 09:376881)

INIS-mf-4416 PC **A06**/MF **A01**
Department of Atomic Energy, Bombay (India).
Annual Report of the Department of Atomic Energy 1977-78.
1978, 115p
U.S. Sales Only.

No abstract available.

INIS-mf-4452 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Evolution of the Legal System of Nuclear Research in the European Communities.
M. Prelle. 1977, 11p CONF-7710196-25
Nuclear Inter June 1977, Florence, Italy, 2 Oct 1977.
U.S. Sales Only.

No abstract available.

INIS-mf-4501 PC **A03**/MF **A01**
Atomic Energy Board, Pelindaba, Pretoria (South Africa).
Atomic Energy Board, Twenty First Annual Report, 1977.
30 Apr 78, 48p
U.S. Sales Only.

Progress is reported on the following: nuclear materials, nuclear power, application of radioisotopes and radiation, health and safety, and fundamental studies undertaken in the fields of physics, chemistry, metallurgy, medicine and geology during 1977. The supporting activities of the computer services, engineering sevices, waste disposal plant, instrumentation section, research reactor and analytical services are given for 1977. The report contains a bibliography of publications published by staff members and bursars of the Atomic Energy Board during 1977. (Atomindex citation 09:412269)

INIS-mf-4513 PC **A05**/MF **A01**
Stichting Energieonderzoek Centrum Nederland, The Hague.
Annual Report 1977.
Jun 78, 92p
In Dutch.
U.S. Sales Only.

The change of statute made in 1976 has been followed by a shift of emphasis towards non-nuclear subjects in the ECN Research Centre. A performance testing of experimental wind turbines to be installed at the Petten site, is done in the framework of the national energy R and D programmes. An effort on technical superconductors and superconducting coils became the subject of a cooperation with the Netherlands Applied Research Organisation TNO and some industrial companies. Programmes on magnetohydrodynamic conversion and on energy storage in flywheels are in advanced preparation. A large experimental effort is devoted to the fast reactor development programme of Germany, Belgium and the Netherlands. Complete is the estimation of the reactivity effects of fission products in the prototype fast reactor under construction at Kalkar. The HFR will also be used in a new series of transient overpower experiments on fast reactor fuel pins. ECN activities in the nuclear fuel cycle are concentrated on the disposal of radioactive work in salt domes. (Atomindex citation 10:421702)

INIS-mf-4596 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Ordinance No.12 of 22 January 1976 on the Supervisory Authority under the Atomic Energy Act No. 306 of 1956.
1976, 1p
In Swedish.
U.S. Sales Only.

This Ordinance, which repeals various earlier texts, makes the Swedish Nuclear Power Inspectorate responsible for supervisory compliance with certain provisions of the Atomic Energy Act of 1 June 1956 and with certain conditions laid down under that Act. The Inspectorate is also the authority in charge of examining applications for licences to acquire, possess, supply, process and export certain nuclear materials. (Atomindex citation 10:421636)

INIS-mf-4613 PC **A02**/MF **A01**
British Insurance (Atomic Energy) Committee, London (England).
Recent Developments in the European Nuclear Insurance Scene.
H. W. Francis. 1978, 5p CONF-780584-13
International conference on regulating nuclear energy, Brussels, Belgium, 16 May 1978.
U.S. Sales Only.

Despite the development of a strong anti-nuclear feeling in Europe, the nuclear programme in the main European countries has not been stopped. The European insurance market has evolved considerably and the liability limits have been raised in several countries. Insurers must face the twin problem of increased insurance capacity to cover material damage, as well as the higher liability amounts for operators of nuclear installations in certain countries. (Atomindex citation 10:421659)

INIS-mf-4614 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Nuclear Liability Insurance Problems and Trends as Seen by the European Utilities.
A. van Gulck. 1978, 10p CONF-780584-14
International conference on regulating nuclear energy, Brussels, Belgium, 16 May 1978.
U.S. Sales Only.

After recalling the basic principles of nuclear civil liability conventions, the author describes the different types of damage presently covered by nuclear insurance. Also, a Study Committee was cre-

ated in Western Europe in 1974 to examine the possibility of setting up a mutual pool to cover risks such as fire and property damage in nuclear installations. In the immediate future machinery breakdown and all risk coverage on-site will not be covered. This mutual pool will widen the nuclear insurance market in the coming decades. (Atomindex citation 10:421660)

INIS-mf-4625 PC **A02**/MF **A01**
Nuclear Energy Agency, Paris (France).
International Nuclear Liability Conventions: Status and Possible Changes.
P. Reyners. 1978, 21p CONF-780584-15
International conference on regulating nuclear energy, Brussels, Belgium, 16 May 1978.
U.S. Sales Only.

The table of ratifications and accessions annexed to this paper shows that despite the considerable progress achieved these past years and the entry into force of the Vienna Convention, the number of Contracting Parties to the Nuclear Civil Liability Conventions remains insufficient. The adaptation of the first of these Conventions - the Paris Convention - as well as its Brussels Supplementary Convention to the technical and economic developments which have taken place since their adoption should provide the means for encouraging their implementation at international level. The main amendments which are envisaged are replacement of the present unit of account by the Special Drawing Right, the increase of the amounts of liability and compensation and finally, the technical scope of the Paris Convention. (Atomindex citation 10:421663)

INIS-mf-4629 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Export Policy and Non-Proliferation.
D. A. V. Fischer. 1978, 6p CONF-780584-17
International conference on regulating nuclear energy, Brussels, Belgium, 16 May 1978.
U.S. Sales Only.

Developing countries with a nuclear programme are about a dozen according to information obtained by IAEA. They are a group hostile to any restriction imposed on nuclear technology export and consider that such restriction is contrary to the global concept of North/South co-operation which provides for transfer of advanced technology. In particular, they object to the fact that nuclear weapon states make use of Article 4 of the NPT. Industrialised countries are required to keep a balance between a regular and stable supply system and the assurance that exported nuclear installations and materials are placed under international control according to the IAEA Safeguards. (Atomindex citation 10:421676)

INIS-mf-4630 PC **A02**/MF **A01**
Doub, Purcell, Muntzing and Hansen, Washington, DC.
Update on U.S. Export Legislation.
W. O. Doub. 1978, 17p CONF-780584-21
International conference on regulating nuclear energy, Brussels, Belgium, 16 May 1978.
U.S. Sales Only.

This paper provides an in-depth analysis of the U.S. Nuclear Non-proliferation Act of 1978. It reviews the essential amendments that Act has made to the 1954 Atomic Energy Act. These concern redefinition of the NRC's role, its relations with the Executive Branch and governmental agencies, new conditions imposed by the U.S. on importing countries and the advantages provided in return. (Atomindex citation 10:438388)

INIS-mf-4631 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Nuclear Export Policy and Regulation for Non-Proliferation: Federal Republic of Germany.
W. Boulanger. 1978, 8p CONF-780584-16
International conference on regulating nuclear energy, Brussels, Belgium, 16 May 1978.
U.S. Sales Only.

The nuclear export policy of the Federal Republic of Germany complies with the principle of non-proliferation of nuclear weapons. Already in 1967 the Federal Government stated in a Peace Note that no export was authorised to countries (outside Euratom) which did not comply with the IAEA Safeguards. In the bilateral agreement the Federal Republic signed with Brasil in 1975, emphasis was put on international safeguards and the control exercised on exported materials to avoid any diversion for military purposes. (NEA) . (Atomindex citation 10:421674)

INIS-mf-4633 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
United States Non-Proliferation Policy.
R. T. Kennedy. 1978, 11p CONF-780584-18
In French.International conference on regulating nuclear energy, Brussels, Belgium, 16 May 1978.
U.S. Sales Only.

The 1978 Act on Non-Proliferation reflects the new orientations of the U.S. energy policy. This policy is based on six objectives: optimization of the efficiency of the international safeguards system by insisting on the comprehensive and detailed character of such safeguards; moderation in transfer of sensitive technologies and materials enabling weapons' manufacture; encouragement of non-proliferation by assuring fuel supply and by assisting in irradiated fuel management; achievement of a consensus on the structure and management for the future of the nuclear fuel cycle in the frame of work conducted during the International Fuel Cycle Evaluation; adoption of internal measures ensuring compatibility of the national nuclear policy with international objectives; concrete action to diminish any reasons of prestige or safety that might induce states to manufacture nuclear explosives. (NEA) . (Atomindex citation 10:421677)

INIS-mf-4756 PC **A15**/MF **A01**
Paris-2 Univ., 75 (France).
Cooperation in Research in the European Atomic Energy Community (EURATOM).
P. Marka. 1977, 310p
In French.These (D. Droit).
U.S. Sales Only.

This work studies the legal instruments for cooperative research granted to Euratom under the Treaty establishing the European Atomic Energy Community, and the conditions whereby concrete use was made of these instruments. This assessment of Euratom's efforts to launch a community nuclear industry is accompanied by an analysis of the respective roles of the bodies of the Community, the Council and the Commission, as well as of the circumstances which, according to the author, have led to a paralysis of this institution. (Atomindex citation 10:434007)

INIS-mf-4807 PC **A02**/MF **A01**
Decree No. 78-662 of 22 June 1978 Concerning the Atomic Energy Commission.
1978, 1p
In French.
U.S. Sales Only.

This Decree repeals Section 2 of the Order, as amended, of 18 October 1945 creating the French Atomic Energy Commission (CEA) which concerns the procedures and periodicity of the meetings of the Atomic Energy Committee. It also lays down that the title of Administrator General Delegate is replaced by that of Administrator General. (Atomindex citation 10:446285)

INIS-mf-5291 PC **A04**/MF **A01**
Department of Atomic Energy, Bombay (India).
Department of Atomic Energy (India): Annual Report 1978-79.
1979, 60p
U.S. Sales Only.

The research and development activities and achievements of the research organizations of the Department of Atomic Energy (DAE, India), progress of various DAE projects underway and performance of nuclear power plants and other public sector underking of DAE have been reported. The report covers the financial year 1978-79. Some of the major achievements during the year have been: (1) development of a portable local vacuum electron beam welding machine, (2) commissioning of the Variable Energy Cyclotron, Calcutta for obtaining an external beam of 30 MeV alphas, (4) locating minute leaks by tracer techniques on the 140 km. Koyali-Viramgam Oil pipeline and (5) investigation by tracer technique of geological fault at the Lakya dam site of the Kudremukh Iron Ore Project in Karnataka. The R and D work of the Bhabha Atomic Research Centre, Bombay; Reactor Research Centre, Kalpakkam; Tata Institute of Fundamental Research, Bombay; Saha Institute of Nuclear Physics, Calcutta, Tata Memorial Centre and Cancer Research Centre both at Bombay is summarised. (Atomindex citation 10:495327)

INIS-mf-5305 PC **A07**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.).
GKSS 1978 Annual Report.
1979, 128p
In German.
U.S. Sales Only.

In its annual reports, the GKSS gives a detailed survey of its R+D activities in the year under report as well as of its organisation and social situation. These sections are supplemented by some detailed reports on selected research activities. In the year under report, techniques for the irradiation of pressure vessel steels in research reactors, the determination of the critical heat flux on LWR fuel rods, a GKSS contribution to the production of manganese modules in the Pacific Ocean, the corrosion behaviour of structural steels under seawater conditions, and remote aerosol monitoring by means of laser technology are dealt with. (Atomindex citation 10:491738)

INIS-mf-5505 PC **A06**/MF **A01**
Bundesanstalt fuer Materialpruefung, Berlin (Germany, F.R.). Fachgruppe Zerstoerungsfreie Pruefung.
Non-Destructive Testing in Nuclear Engineering. Bibliography.
U. Voelkel, and U. Knuepfer. 1978, 114p
In German and English.
U.S. Sales Only.

This bibliography contains 312 abstracts from the store of the documentation on non-destructive testing. (Atomindex citation 11:514209)

INIS-mf-5519 PC **A02**/MF **A01**
Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice (Czechoslovakia).
Surface and Structural Stability of A-1 Fuel Element Cladding.
K. Splichal, and F. Slancar. 2p CONF-7804146-15(Sum.)
In Czech.Corrosion problems on nuclear reactor components, Piestany, Czechoslovakia, 12 Apr 1978.
U.S. Sales Only.

No abstract available.

INIS-mf-5522 PC **A02**/MF **A01**
Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice (Czechoslovakia).
Topical Problems of Corrosion Research for Nuclear Power Purposes.
B. Eremias. 1p CONF-7804146-12(Sum.)
In Czech.Corrosion problems on nuclear reactor components, Piestany, Czechoslovakia, 12 Apr 1978.
U.S. Sales Only.

No abstract available.

INIS-mf-5576 PC **A03**/MF **A01**
Sovet Ekonomicheskoi Vzaimopomoshchi, Moscow (USSR). Postoyanniya Komissiya po Ispol'zovaniyu Atomnoi Energii v Mirnykh Tselyakh.
Research Reactors Nuclear Safety Regulations.
1979, 30p
In Russian.
U.S. Sales Only.

The regulations were approved in November 1978 by the Permanent Commission of CMEA on peaceful utilization of nuclear energy for application in the CMEA member-countries. The regulation contain: general principles; basic concepts, definitions

and terminology; technical specifications of design and equipment of a research reactor; order of a research reactor putting into operation; order of a research reactor operation; rules for transportation and storage of "fresh" and spent reactor fuels; recommendations on personnel composition and qualification for a research reactor; rules for the personnel actions in emergency situations; order of a research reactor nuclear safety control and inspection. The regulations establish demands and conditions of the CMEA member-countries research reactors nuclear safety. The regulations are spreaded to all research reactors under operation, construction and projecting irrespective to their type and departmental belonging. The regulations has been developed taking into consideration the standards in force in the CMEA member-countries and operation experience on research reactors. The state supervision on research reactors and other nuclear installations nuclear safety is performed by the State Inspection on nuclear safety of the country ("Gosatomnadzor"). (Atomindex citation 11:514683)

INKA-Conf-79-410-002

PC **A02**/MF **A01**

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.).

Nuclear Long-Distance Energy.

R. Harth, and H. F. Niessen. Oct 79, 4p CONF-7910162-2

In German.Meeting on high temperature reactors, Essen, F.R. Germany, 25 Oct 1979.

U.S. Sales Only.

The paper explains the concept of 'nuclear long-distance energy' the underlying principle, and lists the characteristics and possible uses of a 'nuclear long-distance energy system'. The R+D activities of the Juelich nuclear research centre are mentioned. (Atomindex citation 11:509290)

INKA-Conf-79-410-004

PC **A02**/MF **A01**

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe und Heisse Zellen.

Material Problems.

H. Schuster. 1979, 24p CONF-7910162-1

In German.Meeting on high temperature reactors, Essen, F.R. Germany, 25 Oct 1979.

U.S. Sales Only.

For the development and realisation of HTR reactors, modern high-temperature materials must be adapted to nuclear demands, and special materials must be developed. The paper discusses some aspects of structural materials for core shutdown components with a special view to HTR reactors. (Atomindex citation 11:509058)

JAERI-M-7437 PC **A08**/MF **A01**

Japan Atomic Energy Research Inst., Tokyo.

ROSA-II Test Data Report, 10. Effects of Secondary System and HPCI System in Small Breaks (Runs 415, 417, 421, 422).

Dec 77, 151p

In Japanese.

U.S. Sales Only.

Results of the ROSA-II test simulating a loss-of coolant accident (LOCA) in a light water reactor (LWR) are presented, including the test conditions and interpretation of the phenomena for test runs 415, 417, 421 and 422. Even in small break at the cold leg, the core is exposed to void and the temperature rises. In small break of the hot leg, however, core cooling keeps without temperature rise, because there still remains much residual water and upward core flow exists. Direct effect of the HPCI on the depressurization rate is small, but it increases the accumulator injection rate, leading to early core reflooding and early core cooling from upward. Effects of the secondary system depressurization are increase of depressurization and discharge rates of the primary loop, which results in early initiation of the accumulator injection and core reflooding. (Atomindex citation 09:411846)

JAERI-M-7450 PC **A10**/MF **A01**

Japan Atomic Energy Research Inst., Tokyo.

Data Report on Series 5 Reflood Experiment.

J. Sugimoto, Y. Murao, T. Iguchi, T. Sudoh, and Y. Sudo. Jan 78, 209p

In Japanese.

U.S. Sales Only.

Measured results and calculated heat transfer behavior in Series 5 reflood experiment are presented. The purpose of experiments carried out from March to April 1977 was to examine quench characteristics at low flooding rate in 2 step-wise variable flow rate; to measure steady state differential pressure in the core; and to observe flow oscillation behavior of the system with small inlet flow resistance. Analysis was given previously. (Atomindex citation 09:411857)

JAERI-M-7753 PC **A08**/MF **A01**

Japan Atomic Energy Research Inst., Tokyo.

Theoretical and Experimental Studies on Measurement of Large Negative Reactivities.

N. Mizoo. Sep 78, 173p

In Japanese.

U.S. Sales Only.

A theoretical modification method for obtaining the static reactivity by experiment, and its experimental verification, reliability and applicability in power reactors are described. A formulation of the correction factor is given for neutron source multiplication method, source jerk method, rod drop method and pulsed neutron source method respectively. Experimental verification is made on FCA assemblies VI-2 B2 and VII-1, using up to 9 simulating control rods; the reactivity ranges from -0.43% delta k/k to -10% delta k/k. The three methods are used for verification. By application of the theoretical modification to the experiments, the reactivities not depending on the detector position are obtained, which are in good agreement between the different measuring methods. Reliability of the correction factor is examined both numerically and analytically with variational method. The error of the correction factor caused by errors in group constants etc. is much smaller than that of the calculated reactivity with the same group constants. (Atomindex citation 11:497179)

JAERI-M-7970 PC **A05**/MF **A01**

Japan Atomic Energy Research Inst., Tokyo.

Prediction of ROSA-III Experiment Run 702.

Y. Koizumi, K. Soda, and O. Kikuchi. Nov 78, 76p

In Japanese.

U.S. Sales Only.

The purpose of the ROSA-III experiment with a scaled BWR test facility is to examine primary coolant thermalhydraulic behavior and performance during a postulated loss-of-coolant accident of BWR. The results provide information for verification and improvement of reactor safety analysis codes. Run 702 assumes a recirculation line double ended break at the pump suction with average core power and no ECCS. Prediction of the Run 702 experiment was made with computer code RELAP-4J. What determine the coolant behavior are mixture level in the downcomer and flowrates and flow directions at jet pump drive flow nozzle, jet pump suction and discharge. There is thus the need for these measurements to compare predicted results with experimental ones. The liquid level formation model also needs improvement. (Atomindex citation 11:496849)

JAERI-M-8046 PC **A09**/MF **A01**

Japan Atomic Energy Research Inst., Tokyo.

Use Characteristics of Low Enriched Uranium Fuel in High Temperature, Gas-Cooled Reactors.

T. Yasuno, Y. Miyamoto, R. Shindo, T. Seya, and S. Sato. Feb 79, 181p

In Japanese.

U.S. Sales Only.

The low enriched uranium fuel cycle in High Temperature, Gas-Cooled Reactor (HTGR) was evaluated in Japan, in connection with the International Nuclear Fuel Cycle Evaluation (INFCE). Core design and material balance of HTGR are described. (Atomindex citation 11:497267)

JAERI-M-8063 PC **A04**/MF **A01**

Japan Atomic Energy Research Inst., Tokyo.

Use of Low Enriched Uranium Fuel Cycle in High Temperature Gas-Cooled Reactors.

Jan 79, 60p

U.S. Sales Only.

In Japan, research and development of the experimental multipurpose VHTR (Very High Temperature gas-cooled Reactor) have been carried out with aiming at application of the reactor to process heat. The reactor employs the LEU fuel cycle because the cycle is compatible with the LWR-FBR line calling for Pu recycle in Japan. On the basis of the experience gained from these works and the above philosophy of fuel cycle, core models are constructed for commercial high temperature gas-cooled reactors (HTGR) with thermal output of 3000 MW, and the material balances of the reactor and the fuel cycle system are studied. Two core models are assumed for comparison; one is a VHTR with an outlet temperature of 1000 exp 0 C for process heat application and the other a steam cycle HTGR with an outlet temperature of 750 exp 0 C. Material balances are estimated for each model, which are uranium requirements during the life of 30 years, separative work, plutonium productions, generations of fission products (including exp 3 H and exp 14 C). The results are compared with each other and with LWR data. The comparison indicates that the savings of separative work and uranium requirements are larger in VHTR than in HTGR and that uranium requirements and plutonium productions per unit electric output are smaller in these HTR's than in LWR's. should be recycled to LWR's or FBR's, the integrated system of the fuel cycle consisting of fabrication of fuels, reprocessing and waste management are studied. In addition, the status and R and D requirements of each process are surveyed and some processes are also assessed from the viewpoints of proliferation resistance and environmental impact. (Atomindex citation 11:497262)

JAERI-M-8109 PC **A03**/MF **A01**

Japan Atomic Energy Research Inst., Tokyo.

Natural Convection of High-Temperature, High-Pressure Gas in a Horizontal Annular Layer of Thermal Insulator, (1). Program for Numerical Calculation with Temperature-Dependent Physical Properties.

M. Ogawa, T. Takizuka, and K. Sanokawa. Feb 79, 35p

In Japanese.

U.S. Sales Only.

Numerical calculations are described of the natural convection in a horizontal annular layer of thermal insulator. The purpose is to compare the numerical results for variable physical properties with those for constant properties. The numerical procedure and typical results are presented. (Atomindex citation 11:497266)

JAERI-M-8119 PC **A09**/MF **A01**

Japan Atomic Energy Research Inst., Tokyo.

Computer Programs, THYDE-B1 for Analysis of Small Break LOCA of a BWR and THYDE-B-REFLOOD for Analysis of Reflood Phase.

K. Muramatsu. Mar 79, 177p

In Japanese.

U.S. Sales Only.

Two Computer Programs, THYDE-B1 and THYDE-B-REFLOOD have been developed for evaluation of ECCS performance during a LOCA in a BWR. THYDE-B1 is mainly concerned with blowdown phase of small break LOCA's with a special enphasis on the behavior of the mixture level in the core. It solves integral forms of fluid conservation and state equations, as well as the heat transfer between fluid and fuel rods or other structures under various modes of ECCS operation. THYDE-B-REFLOOD is to predict the time of core reflooding by analysing thermohydraulics within the core shroud. Various interactions between the fluid in the core shroud and the injected ECC water, such as so-called CCFL phenomenon, are accounted for with models provided in the program. (Atomindex citation 11:509328)

JAERI-M-8137 PC **A06**/MF **A01**

Japan Atomic Energy Research Inst., Tokyo.

Design and Tests of the Modified Control Rod Drive System. Modification of JRR-2.

D. Nemoto, K. Kawakami, T. Koganezawa, M. Sato, and Y. Miyasaka. Mar 79, 113p

In Japanese.

U.S. Sales Only.

In the modification of Research Reactor JRR-2 completed by October 1975, the control rods and

drive systems were all replaced by the modified ones to improve the mechanism. The drive mechanism was changed from rack-pinion to ball-nut screw, and the drive package was relocated from reactor side wall to reactor top face. Electromagnet, On-Magnet detector and Curl-cord were newly designed, and subsequently subjected various tests under irradiation such as radiation damage, heat cycle and wear resistance. Full-scale mock-up tests were then made to confirm the functions and endurance of the modified control rod drive system, in more than 1000 scrams. Following on criticality test of the reactor complete by November 11, 1975, the functional tests and reactivity worth measurements were made showing good results of the new system. The system is now operating successfully more than 10,000 hours (35 cycles) after modification. (Atomindex citation 11:497216)

JAERI-M-8185 PC **A07**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
LOCA Analysis of BWR/6 for the ROSA-III Test.
H. Kitaquchi, M. Suzuki, and M. Sobajima. Mar 79, 133p
In Japanese.
U.S. Sales Only.

For the experimental conditions of ROSA-III test, it is useful to examine LOCA phenomena in an actual boiling water reactor (BWR/6) with computer code RELAP-4J. For the purpose, the effect of parameters on the LOCA phenomena were studied, including decay heat, physical properties of UO sub 2 and cladding, physical properties of gap, pump characteristic curves, discharge coefficient C sub(d), heat slab, fluid volume and height of break location. Furthermore, the effects of ECC on core cooling and different computer code (RELAP-4EM (Mod 3) as another evalution code) on the analytical results were also examined. In conclusion, the physical properties of gap influence LOCA phenomena and core cooling most sensitively. The power control in the ROSA-III test having electrical heater rods thus must be studied in detail, in order to simulate the heat release from fuel rods to coolant in LOCA phenomena of BWR/6. (Atomindex citation 11:508374)

JAERI-M-8211 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Computer Code TOBUNRAD for PWR Fuel Bundle Heat-Up Calculations.
T. Shimooke, and K. Yoshida. May 79, 107p
In Japanese.
U.S. Sales Only.

The computer code TOBUNRAD developed is for analysis of "fuel-bundle" heat-up phenomena in a loss-of-coolant accident of PWR. The fuel bundle consists of fuel pins in square lattice; its behavior is different from that of individual pins during heat-up. The code is based on the existing TOODEE2 code which analyzes heat-up phenomena of single fuel pins, so that the basic models of heat conduction and transfer and coolant flow are the same as the TOODEE2's. In addition to the TOODEE2 features, unheated rods are modeled and radiation heat loss is considered between fuel pins, a fuel pin and other heat sinks. The TOBUNRAD code is developed by a new FORTRAN technique which makes it possible to interrupt a flow of program controls wherever desired, thereby attaching several subprograms to the main code. Users' manual for TOBUNRAD is presented: The basic program-structure by interruption method, physical and computational model in each sub-code, usage of the code and sample problems. (Atomindex citation 11:509331)

JAERI-1260 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
General Dimensional Neutron Diffusion Calculation Code: ADC.
M. Akimoto, and Y. Naito. Mar 79, 35p
U.S. Sales Only.

A FORTRAN computer program ADC is developed for the FACOM 230-75 computer to be capable of solving eigenvalue problems of neutron diffusion equation in one, two and three spatial dimensions. The available coordinate systems are orthogonal (X), (X,Y), (X,Y,Z) and cylindrical (R,Z), (R,THETA), (R,THETA,Z). The outer boundary condition for the neutron flux can be chosen to be symmetric, zero flux or log-derivative condition. The present program can be used also for obtaining the adjoint flux. (Atomindex citation 11:509318)

JAPFNR-464 PC **A04**/MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan).
Neutron and gamma Ray Streaming Experiments at the Fast Neutron Source Reactor YAYOI. PNC-J--260-79-01-Tr.
Y. Oka, I. Yanagisawa, M. Akiyama, and S. An. Jul 79, 75p
Work performed under United States-Japanese Fast Reactor Exchange Program.
U.S. Sales Only.

Neutron and gamma ray streaming experiments were performed in the ducts and cavities that were located in the heavy concrete shields of the fast neutron source reactor YAYOI of University of Tokyo. The configurations have the feature that the streaming through the ducts are occurred following the scattering in the cavity. The axes of the ducts are perpendicular to the source radiation from the core. The spectrum of the source was modified by putting a plug in the beam hole of the core. An aluminum plug and the plug which contains paraffin were used. The decay in the ducts, however, hardly depends on the source spectrum. The decay in the ducts is nearly exponential. (ERA citation 05:030684)

JAPFNR-466 PC **A02**/MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Oarai (Japan). Oarai Engineering Center.
Activities in SBL-FPL Loops for Safety Study of LMFBR(I). PNC-N--941-79-79.
Jun 79, 22p
Work performed under United States-Japanese Fast Reactor Exchange Program.
U.S. Sales Only.

As the first step for the safety study of LMFBR, it is necessary to understand the initial events of possible accidents in LMFBR. Local faults and sodium boiling can be considered in that area. SBL and FPL were constructed to understand such phenomena experimentally. Two loops own jointly the dump tank and the purification loop. SIENA is the generic name to both loops. Test programs involving the test loops are described. (ERA citation 05:030708)

JINR-R-3-12051 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Reactor IBR-2 Start-Up. Fission Density Distribution in the Reactor Core.
A. I. Babaev, V. Gudovskii, V. V. Melikhov, Yu. N. Pepelyshev, and E. P. Shabalin. 1979, 14p
In Russian.
U.S. Sales Only.

Fission density distribution in the reactor core was studied during the operation of the IBR-2 reactor at zero power in the beginning of 1978. The intensity of residual gamma activity was estimated by measuring the height and turning angle of fuel element clusters with respect to scitillation detector. Fuel element clusters extracted from the reactor core were installed so that any point on their surface could be oriented from a distance to face a tungsten collimator. It is shown that volume inhomogeneity coefficient obtained experimentally is in agreement with the theoretical one, i.e. it is equal to 1.56. The most energy tense area of the reactor core was outlined. The distribution measured is in agreement within the accuracy limit with that calculated by the Monte-Carlo method. Some periphery areas of fuel element clusters were found to have higher fission intensity possibly due to fission on epithermal neutrons scattered by a moving reflector. (Atomindex citation 11:509155)

JINR-R-3-12449 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Reactor IBR-2 Physical Start-Up. Prompt Neutron Life Time Measurement.
V. V. Gusev, W. Gudowski, and V. V. Dmitrienko. 1979, 16p
In Russian.
U.S. Sales Only.

Prompt neutron life time tau for the IBR-2 core without sodium was measured by means of Rossi-alpha method, comparison between experimental and calculated neutron pulse shape, power spectra analysis, and experimental dependence of the peak pulse power dispersion upon a mean power of the reactor. Fission chambers were used for these purposes. The role of various reactor components, which have an effect on tau value, was investigated. Experimental value of tau depends on constructional features of the outer environment of the core and ranges from 46 up to 83 ns. The theoretical value of 42 ns differs from experimental one mainly because of some features of the moving reflector device which has not been taken into consideration for the calculations performed. The recommendations are given which allow to diminish tau up to 50-55 ns. (Atomindex citation 11:509156)

KFK-2787 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
TP2, a Computer Program for the Calculation of Reactivity and Kinetic Parameters by the Two-Dimensional Neutron Transport Perturbation Theory.
K. Kobayashi. Jul 79, 62p
Work performed under United States-W. Germany Fast Reactor Exchange Program.
U.S. Sales Only.

TP2 is a FORTRAN-IV program for the calculation of the reactivity, effective delayed neutron fractions and mean generation time by the perturbation theory using the angular fluxes calculated by a two-dimensional S/sub n/ transport code. Group cross sections, delayed neutron fractions and spectra, isotope dependent prompt neutron spectrum, and direct and adjoint angular fluxes are read from disk files. This code can treat x-y, r-z, and r-theta geometry in two dimensions, and the code structure is nearly the same as the TP1 code for the one-dimensional geometry. (ERA citation 05:030649)

KFK-2789 PC **A06**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
HEXAGA-II-120, -60, -30: Two-Dimensional Multi-Group Neutron Diffusion Programmes for a Uniform Triangular Mesh with Arbitrary Group Scattering.
Z. Woznicki. Jun 79, 110p
Work performed under United States-W. Germany Fast Reactor Exchange Program.
U.S. Sales Only.

This report presents the AGA two-sweep iterative methods belonging to the family of factorization techniques in their practical application in the HEXAGA-II two-dimensional program to obtain the numerical solution to the multi-group, time-independent, (real and/or adjoint) neutron diffusion equations for a fine uniform triangular mesh. An arbitrary group scattering model is permitted. The report written for the users provides the description of input and output. The use of HEXAGA-II is illustrated by two sample reactor problems. (ERA citation 05:030650)

LA-UR-79-3301 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
System Calculations Related to the Accident at Three-Mile Island Using TRAC.
J. R. Ireland. 1980, 11p CONF-800723-12
Contract W-7405-ENG-36
19. national heat transfer conference, Orlando, FL, USA, 27 Jul 1980.

The Three Mile Island nuclear plant (Unit 2) was modeled, using the Transient Reactor Analysis Code (TRAC-P1A) and a base case calculation, which simulated the initial part of the accident that occurred on March 28, 1979, was performed. In addition to the base case calculation, several parametric calculations were performed in which a single hypothetical change was made in the system conditions, such as assuming the high pressure injection (HPI) system operated as designed rather than as in the accident. Some of the important system parameter comparisons for the base case as well as some of the parametric case results are presented. (ERA citation 05:029091)

LA-8358-MS PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Coprecal: Materials Accounting in the Modified Process.
H. A. Dayem, E. A. Kern, and J. P. Shipley. May 80, 40p
Contract W-7405-ENG-36

This report presents the design and evaluation of an advanced materials accounting system for a uranium-plutonium nitrate-to-oxide coconversion facility based on the General Electric Coprecal process as modified by Savannah River Laboratory and Plant and DuPont Engineering. The modifications include adding small aliquot tanks to feed the process and reconfiguring the calciner filter systems. Diversion detection sensitivities for the modified Coprecal process are somewhat better than the original Coprecal design, but they are still significantly worse than a same-sized conversion facility based on the oxalate (III) precipitation process. (ERA citation 05:028540)

LUTMDN/TMVK-5081 PC **A04**/MF **A01**
Lund Univ. (Sweden).
Information of the Nuclear Industry Before and During the Nuclear Debate.
P. Borgstroem. Oct 78, 66p
In Swedish.
U.S. Sales Only.

A review of the organization and resources for information and public relations, which the nuclear industry have at its disposal in Sweden as well as in other countries. Furthermore, pre-nuclear organizations in the Northern Countries, which are not financed by the nuclear industry are discussed. (Atomindex citation 10:438442)

NUREG/CR-1450 PC **A07**/MF **A01**
Oak Ridge National Lab., TN.
Multirod Burst Test Program Progress Report for July-December 1979,
R. H. Chapman. Aug 80, 137p ORNL/NUREG/TM-392
Contract W-7405-eng-26
See also report for Jan-Mar 79, NUREG/CR-0817.

A series of scoping tests designed to explore the effect of shroud heating on Zircaloy cladding deformation was conducted in the single-rod test facility, which was recently modified to permit independent heating of the shroud under specified conditions. To facilitate comparison of the test results, the series included tests under conditions used previously. Significantly greater deformation was observed in heated shroud tests than would be expected from unheated shroud tests. Fabrication of fuel pin simulators for the B-5 (8 x 8) bundle test continued with about 90% of the required number being completed. Five fuel pin simulators, identical to the simulators used in the Japanese Atomic Energy Research Institute multirod bundle burst tests, were delivered by the Japanese manufacturer. The surface temperature distribution of the simulators was characterized for several heating rates by infrared scanning and was compared to similar characterizations of Oak Ridge National Laboratory simulators. Plans are under way for conducting burst tests on the Japanese simulators in the single-rod test facility.

NUREG/CR-1536 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
PRESBC: Pressure Boundary Conditions for the K-FIX Code,
J. R. Travis, and W. C. Rivard. Jul 80, 21p LA-NUREG-6623-SUPPL-3
Contract W-7405-eng-36

Recommended pressure boundary condition modifications are described for the computer code K-FIX, which has been published in the report LA-NUREG-6623 and released to the National Energy Software Center in April 1977.

NUREG/CR-1611 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Fuel Fragmentation by Fission Gases during Rapid Heating,
D. H. Worledge. Jun 80, 75p SAND-80-0328
Contract AT(29-1)-789
Sponsored in part by United Kingdom Atomic Energy Authority, London (England).

Criteria for the advance of cracks between fission gas bubbles have been developed for application to LMFBR irradiated fuel under transient heating conditions. The criteria involve stress states, differential and total energy conditions, and mass transfer at the crack. Three experiments have been analyzed using a model of gas behavior which treats both intragranular and intergranular gas bubbles as mobile, non-equilibrium entities. In one experiment which showed fine-scale fuel dispersal in the solid state, these postulated dispersal criteria were calculated to be satisfied. Calculations were performed for a number of hypothetical transients. The trend of the results indicates that heating at 100 K/ms produces the grain boundary cracking conditions rather easily, a few hundred degrees below the melting point. Heating rates of 1 K/ms do not in general lead to the cracking conditions.

NUREG-0653 PC **A08**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Report on Nuclear Industry Quality Assurance Procedures for Safety Analysis Computer Code Development and Use.
Technical rept.,
Brian W. Sheron, and Zoltan R. Rosztoczy. Aug 80, 166p

As a result of a request from Commissioner V. Gilinsky to investigate in detail the causes of an error discovered in a vendor Emergency Core Cooling System (ECCS) computer code in March, 1978, the staff undertook an extensive investigation of vendor quality control practices as applied to safety analysis computer code development and use. This investigation included conducting inspections of code development and use practices of the four major light water reactor nuclear steam supply system vendors and a major reload fuel supplier. The conclusion reached by the staff as a result of the investigation is that vendor practices for code development and use are basically sound. A number of areas were identified, however, where improvements to existing vendor procedures should be made. In addition, the investigation also addressed the quality assurance (QA) review and inspection process for computer codes and identified areas for improvement.

ORNL/Sub-7496/2 PC **A04**/MF **A01**
Babcock and Wilcox Co., Lynchburg, VA. Nuclear Power Generation Div.
Fuel Utilization Improvement in PWRs Using the Denatured exp 233 U-Th Cycle.
H. M. Jones, G. A. Schwenk, E. C. Toops, and V. O. Yotinen. Jun 80, 73p BAW-1608
Contract W-7405-ENG-26

A number of changes in PWR core design and/or operating strategy were evaluated to assess the fuel utilization improvement achievable by their implementation in a PWR using thorium-based fuel and operating in a recycle mode. The reference PWR for this study was identical to the B and W Standard Plant except that the fuel pellets were of denatured (exp 233 U/ exp 238 U-Th)O sub 2 . An initial scoping study identified the three most promising improvement concepts as (1) a very tight lattice, (2) thorium blankets, and (3) ThO sub 2 rods placed in available guide tubes. A conceptual core design incorporating these changes was then developed, and the fuel utilization of this modified design was compared with that of the reference case. (ERA citation 05:029005)

ORNL/TM-7175 PC **A09**/MF **A01**
Oak Ridge National Lab., TN.
User's Manual for the ORIGEN2 Computer Code.
A. G. Croff. Jul 80, 196p
Contract W-7405-ENG-26

This report describes how to use a revised version of the ORIGEN computer code, designated ORIGEN2. Included are a description of the input data, input deck organization, and sample input and output. ORIGEN2 can be obtained from the Radiation Shielding Information Center at ORNL. (ERA citation 05:030666)

ORNL/TM-7207 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Conceptual Design Characteristics of a Denatured Molten-Salt Reactor with Once-Through Fueling.
J. R. Engel, H. F. Bauman, J. F. Dearing, W. R. Grimes, and H. E. McCoy. Jul 80, 160p
Contract W-7405-ENG-26

A study was made to examine the conceptual feasibility of a molten-salt power reactor fueled with denatured exp 235 U and operated with a minimum of chemical processing. Because such a reactor would not have a positive breeding gain, reductions in the fuel conversion ratio were allowed in the design to achieve other potentially favorable characteristics for the reactor. A conceptual core design was developed in which the power density was low enough to allow a 30-year life expectancy of the moderator graphite with a fluence limit of 3 x 10 exp 26 neutrons/m exp 2 (E $>$ 50 keV). This reactor could be made critical with about 3450 kg of 20% enriched exp 235 U and operated for 30 years with routine additions of denatured exp 235 U and no chemical processing for removal of fission products. A review of the chemical considerations assoicated with the conceptual fuel cycle indicates that no substantial difficulties would be expected if the soluble fission products and higher actinides were allowed to remain in the fuel salt for the life of the plant. (ERA citation 05:030639)

ORNL-5621 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
ORIGEN2: A Revised and Updated Version of the Oak Ridge Isotope Generation and Depletion Code.
A. G. Croff. Jul 80, 62p
Contract W-7405-ENG-48

ORIGEN2 is a versatile point depletion and decay computer code for use in simulating nuclear fuel cycles and calculating the nuclide compositions of materials contained therein. This code represents a revision and update of the original ORIGEN computer code which has been distributed world-wide beginning in the early 1970s. The purpose of this report is to give a summary description of a revised and updated version of the original ORIGEN computer code, which has been designated ORIGEN2. A detailed description of the computer code ORIGEN2 is presented. The methods used by ORIGEN2 to solve the nuclear depletion and decay equations are included. Input information necessary to use ORIGEN2 that has not been documented in supporting reports is documented. (ERA citation 05:030665)

ORO-6078-1 PC **A15**/MF **A01**
Tennessee Univ., Knoxville. Dept. of Nuclear Engineering.
Cost/Benefit Analysis for Dynamic Testing in the Fast Flux Test Facility.
Q. A. Huynh. Jun 78, 345p
Contract AS05-78ET37506
Thesis.

Dynamic tests are being considered for the Fast Flux Test Facility (FFTF). The assembly of a mathematical model, parameter sensitivity studies, planning the dynamic tests, and the estimation of the cost for the tests were performed. Models were developed with different treatments of the fuel heat transfer. Different representations of the reactivity feedback effects were formulated. The models were used to compute time responses and frequency responses for FFTF. The model has also been used to assess the sensitivity of the response to the values used for important system parameters. (ERA citation 05:029067)

ORO-6078-2 PC **A13**/MF **A01**
Tennessee Univ., Knoxville. Dept. of Nuclear Engineering.
Design, Implementation and Cost-Benefit Analysis of a Dynamic Testing Program in the Experimental Breeder Reactor-II.
S. R. Greene. Mar 79, 281p
Contract AS05-78ET37506
Thesis.

Dynamic tests have been performed for many years in commercial pressurized and boiling water reactors. The purpose of this study was to evaluate the technological and economical feasibility of extending the current light water reactor testing procedures to both present and future liquid metal fast

breeder reactors. A 38 node linearized, lumped parameter, EBR-II system model was developed. This model was analyzed to obtain the predicted system time and frequency response for reactivity perturbations, intermediate heat exchanger secondary inlet sodium temperature perturbation frequency response, and various system nodal frequency response sensitivities. (ERA citation 05:028980)

PATENT-4 162 206
Not available NTIS
Department of Energy, Washington, DC.
Separation of Iodine from Mercury Containing Scrubbing Solutions.
Patent,
L. L. Burger, and R. D. Scheele. Filed 16 Nov 78, patented 24 Jul 79, 4p PAT-APPL-961 174
Supersedes PAT-APPL-961 174-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Radioactive iodines can be recovered from a nitric acid scrub solution containing mercuric nitrate by passing a current through the scrub solution to react the iodine with the mercuric nitrate to form mercuric iodate which precipitates out. The mercuric iodate can then be reacted to recover the radioiodine for further processing into a form suitable for long-term storage and to recover the mercury for recycling. (ERA citation 05:030284)

PB80-853880 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fast Breeder Reactors. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 186p NERACEI NT0569
Sponsored in part by National Technical Information Service, Springfield, VA.

Citations from a worldwide literatue survey contain information on research, development, and applications of fast breeder reactors used in power generating plants. Construction, design criteria, and safety procedures are also discussed. (Contains 183 citations.)

PNL-3337 PC **A16**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
LMFBR In-Core Thermal-Hydraulics: The State of the ART and US Research and Development Needs.
E. U. Khan. Apr 80, 364p
Contract EY-76-C-06-1830

A detailed critical review is presented of the literature relevant to predicting coolant flow and temperature fields in LMFBR core assemblies for nominal and non-nominal rod bundle geometries and reactor operating conditions. The review covers existing thermal-hydraulic models, computational methods, and experimental data useful for the design of an LMFBR core. The literature search made for this review included publications listed by Nuclear Science Abstracts and Energy Data Base as well as papers presented at key nuclear conferences. Based on this extensive review, the report discusses the accuracy with which the models predict flow and temperature fields in rod assemblies, identifying areas where analytical, experimental, and model development needs exist. (ERA citation 05:030652)

RFP-2921 PC **A04**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
***Catalogue of* Monitoring Activities at Rocky Flats: 1978, 1979.**
M. V. Werkema. 20 Jun 80, 67p
Contract AC04-76DP03533

A listing of environmental surveillance sampling endeavors for the years 1978 and 1979 is given in which sampling media, i.e., ambient air, stack effluent air, water, and soil are considered. Sampling locations, frequency of sampling, parameters analyzed, and control limits also are given. The objectives of the sampling are considered in defining the program. (ERA citation 05:029604)

SAND-80-0529C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Combined SAFE/SNAP Approach to Safeguards Evaluation.
D. Engi, L. D. Chapman, F. H. Grant, and J. Polito. 1980, 7p CONF-800655-2
Contract AC04-76DP00789
21. annual meeting of the Institute of Nuclear Materials Management, Palm Beach, FL, USA, 30 Jun 1980.

Generally, the scope of a safeguards evaluation model can efficiently address one of two issues, (1) global safeguards effectiveness, or (2) vulnerability analysis for individual scenarios. The Safeguards Automated Facility Evaluation (SAFE) focuses on (1) while the Safeguards Network Analysis Procedure (SNAP) is directed at (2). SAFE addresses (1) in that it considers the entire facility, i.e., the composite system of hardware and human components, in one global analysis. SNAP addresses (2) by providing a safeguards modeling symbology sufficiently flexible to represent quite complex scenarios from the standpoint of hardware interfaces while also accounting for a rich variety of human decision making. A combined SAFE/SNAP approach to the problem of safeguards evaluation is described and illustrated through an example. (ERA citation 05:028541)

SAND-80-0679(Pt.1) PC **A09**/MF **A01**
Science Applications, Inc., Ames, IA.
Identification of the Impacts of Maintenance and Testing Upon the Safety of LWR Power Plants. Final Report.
A. A. Husseiny, Z. A. Sabri, and J. J. Turnage.
Apr 80, 178p ALO-77/1, SAI-100-81-AM(Pt.1)
Contract AC04-76DP00789

The present study was designed to identify the impact of maintenance and testing (M and T) upon the safety of LWR power plants. The study involved data extraction from various sources reporting safety-related and operation-related nuclear power plant experience. Primary sources reviewed, including Licensee Event Reports (LER's) submitted to the NRC, revealed that only ten percent of events reported could be identified as M and T problems. The collected data were collated in a manner that would allow identification of principal types of problems which are associated with the performance of M and T tasks in LWR power plants. Frequencies of occurrence of events and their general endemic nature were analyzed using data clustering and pattern recognition techniques, as well as chi-square analyses for sparse contingency tables. The results of these analyses identified seven major categories of M and T error modes which were related to individual facilities and reactor type. Data review indicated that few M and T problems were directly related to procedural inadequacies, with the majority of events being attributable to human error. (ERA citation 05:029093)

SAND-80-0679(Pt.2) PC **A07**/MF **A01**
Science Applications, Inc., Ames, IA.
Identification of the Impacts of Maintenance and Testing Upon the Safety of LWR Power Plants. Part II. Final Report.
A. A. Husseiny, Z. A. Sabri, and J. J. Turnage.
Apr 80, 150p SAI-100-81-AM(Pt.2)
Contract AC04-76DP00789

Information is presented concerning overview of literature relating to radiation exposure and operating experience; details of LWR-MTC3 classification system; histograms for individual BWR facilities depicting frequency of M and T mode and frequency of systems and components involved with M and T problems; histograms for individual PWR facilities depicting frequency of M and T mode and frequency of systems and components involved with M and T problems; and Fortran program for M and T data clustering. (ERA citation 05:030712)

SAND-80-0684 PC **A05**/MF **A01**
Teledyne Engineering Services, Waltham, MA.
Technical Program to Study the Benefits of Nonlinear Analysis Methods in LWR Component Designs. Technical Report TR-3723-1.
P. P. Raju. May 80, 91p ALO-82
Contract AC04-76DP00789

This report summarizes the results of the study program to assess the benefits of nonlinear analysis methods in Light Water Reactor (LWR) component designs. The current study reveals that despite its increased cost and other complexities, nonlinear analysis is a practical and valuable tool for the design of LWR components, especially under ASME Level D service conditions (faulted conditions) and it will greatly assist in the evaluation of ductile fracture potential of pressure boundary components. Since the nonlinear behavior is generally a local phenomenon, the design of complex components can be accomplished through substructuring isolated localized regions and evaluating them in detail using nonlinear analysis methods. (ERA citation 05:028940)

SAND-80-1574 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Light Water Reactor Safety Technology Program. Quarterly Report IV, January-March 1980.
D. A. Dahlgren. Jul 80, 68p
Contract AC04-76DP00789

Information on PWR and BWR reactor safety is presented concerning the Technology Management Center support programs; risk method utilization; improved safety systems; man-machine interface; and safety data. (ERA citation 05:030713)

UCID-18574-80-1 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
H-Division Quarterly Report, January-March 1980.
Jun 80, 64p
Contract W-7405-ENG-48

The following research projects were in progress in H Division of the LLL Physics Department during the quarter January to March 1980: Theoretical EOS Group - three-phase EOS model for the H isotopes, development of CHEQ and fluid-fluid phase separations in the inert gases, release-velocity calculations, mixing rule for the EOS of binary ionic mixtures; Experimental Physics Group - progress of the laser EOS program, performance optimization of the two-stage light-gas gun, properties of materials at high pressure; Fluid Physics Group - research on fundamental mechanisms of turbulent gas/solid erosion, triple-point viscosities of the Lennard-Jones fluid, soft-mode instability in Hooke's Law crystals; Applied Physics/Code Development Group - cavity dynamics in the HYLIFE inertial-confinement fusion reactor, equation of state of aluminum nitride powder for explosive compaction. Detailed individual reports on completed work may be expected. 25 figures, 3 tables. (ERA citation 05:030940)

UCRL-82248 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Evaluating Physical Protection Systems of Licensed Nuclear Facilities Using Systems Engineered Inspection Guidance.
R. T. Bradley, A. W. Olson, F. Rogue, S. Scala, and E. W. Richard. 23 Jun 80, 10p CONF-800655-21
Contract W-7405-ENG-48
21. annual meeting of the Institute of Nuclear Materials Management, Palm Beach, FL, USA, 30 Jun 1980.

The Lawrence Livermore National Laboratory (LLNL) and the US Nuclear Regulatory Commission (NRC) Office of Nuclear Regulatory Research (RES) have applied a systems engineering approach to provide the NRC Office of Inspection and Enforcement (IE) with improved methods and guidance for evaluating the physical protection systems of licensed nuclear facilities. (ERA citation 05:028542)

ZJE-219 PC **A03**/MF **A01**
Skoda, Plzen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren.
TRANS - A Computer Program for Analysing Transient Processes in Light Water Reactor Fuel Assembly.
M. Juzova. 1978, 34p
U.S. Sales Only.

The method is described employed in the TRANS computer program to solve transient processes in light water reactor fuel assembly. The system of

equations presented describes the thermo-hydrodynamic effects occurring in the coolant, it deals with the calculation of fuel and canning temperatures, and embraces also the neutron kinetics of the reactor. The program assumes lumped parameters, and heat sources uniformly distributed over the cross-section of an element; axial non-uniformity of heat sources is taken into account. To complete the set of basic equations, additional formulae are included to calculate evaporation rates, heat transfer, slip, pressure drop and critical flows. (Atomindex citation 11:509322)

18J. Reactor Materials

AD-A088 227/4 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Structural Integrity of Water Reactor Pressure Boundary Components.
Quarterly progress rept. Jan-Mar 80,
F. J. Loss. 1 Aug 80, 73p NRL-MR-4254, NUREG-CR-1472
Contract NRC-RES-79-103

This report describes progress in a continuing program to characterize material properties performance with respect to structural integrity of light water reactor pressure boundary components. Progress under fracture mechanics describes J-R curve trends from a low shelf A302-B steel and includes a comparison of R curves by the multispecimen and single specimen compliance procedures. Fatigue crack growth rates are being determined for a variety of pressure vessel and piping steels in simulated nuclear coolant environments. Static load cracking in this environment has been observed in bolt-loaded specimens taken from weld heat-affected zones. Work in radiation sensitivity and postirradiation properties recovery has defined tensile property changes under cyclic annealing and reirradiation treatments. Recent progress is described in radiation studies involving reactor vessel steels in a coordinated IAEA program. Also reported are notch ductility tests of reference steels of the NRC light water reactor, pressure vessel irradiation dosimetry program. (Author)

AERE-R-9537 PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Chemistry Div.
Gas Adsorption Apparatus for Studies on alpha-Active Materials.
R. G. Avery. Aug 79, 15p
U.S. Sales Only.

A gas adsorption apparatus of a basically conventional design but incorporating certain novel features, and modifications to make it suitable for use in a glove box with alpha-active materials is described. The apparatus was designed principally for measurements of surface area and porous properties of spherical fuel particles produced by the gel precipitation route, but is suitable for general use. Experience of operation, and a discussion of some results are included. (Atomindex citation 11:508044)

BLG-522 PC **A03**/MF **A01**
Centre d'Etude de l'Energie Nucleaire, Mol (Belgium).
Acquisition and Verification of Reference LWR Rods.
C. Beets, J. Colard, B. Fontaine, F. Franssen, and G. Busca. 1979, 35p
U.S. Sales Only.

Procedures followed by the operator and the safeguarding authorities are described. These procedures included: a) chemical analysis. b) mass spectrometric measurements by five laboratories. c) non-destructive measurements of enrichment using NaI and Ge detectors effected by three teams working in plant environmental conditions. d) surveillance and containment measures. An estimation of the cost of safeguards verification (manpower, samples to be measured, surveillance) is given. (Atomindex citation 11:509315)

CEA-R-4970 PC **A07**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. d'Etudes des Combustibles a Base de Plutonium.
Kinetics of Initial Stage of Sintering of UO sub 2 , PuO sub 2 and Their Mixture.
These (D. Ing.),
M. M. El Sayed Ali. Feb 79, 137p
In French.
U.S. Sales Only.

This study showed the importance of sintering atmosphere on the first stage of sintering of mixed oxides (UO sub 2 -PuO sub 2) and of each of their constituents i.e. UO sub 2 and PuO sub 2 . The study concerning the mechanism of sintering showed in the case of UO sub 2 sintered under Ar-10% H sub 2 that the sintering may be controlled by surface and grain boundary diffusion mechanisms acting simultaneously. The addition of Nd sub 2 O sub 3 decrease the shrinkage rate of UO sub 2 upon sintering in Ar-10 % H sub 2 . In the case of PuO sub 2 the adsorbed gases may affect the shrinkage kinetics. The shrinkage kinetics of the mixed oxides showed that the envelopping of one component by the other takes place according to the composition in which the dissimilar contacts play an important role. The activation energies obtained in this study are: 48.5 Kcal/mole (870-942 exp 0 C) and 89.9 Kcal/mole (942-1038 exp 0 C) for UO sub 2 sintered in Ar-10% H sub 2 , 115.6 Kcal/mole for UO sub 2 + Nd sub 2 O sub 3 sintered in Ar-10% H sub 2 , 81.6 Kcal/mole (715-785 exp 0 C) and 84.8 Kcal/mole (1035-1230 exp 0 C) for PuO sub 2 sintered in air and 98.5 Kcal/mole (884 exp 0 C-938 exp 0 C) and 122 Kcal/mole (1027-1145 exp 0 C) for the mixed oxide sintered in CO/CO sub 2 gas mixture and Ar-10% H sub 2 respectively. (Atomindex citation 10:494064)

CEA-R-4978 PC **A04**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Div. de Chimie.
Preparation and Certification of a Reference Uranium.
Jun 79, 52p
In French.
U.S. Sales Only.

The CEA Analysis Coordination has produced a reference uranium metal of guaranteed minimum uranium content. The metal was purified by electro-refining in fused salt baths and the dendrites obtained were cast in the form of an ingot by electron bombardment. The ingot was rolled and cut into pieces of mass between 0.5 g and 1.5 g, and each piece conditioned in a glass ampoule under primary vacuum. The total number of reference samples is about 4500. The uranium content was inferred from the impurity concentration determined by spark mass spectrometry and atomic or molecular adsorption spectrophotometry and from the gas concentration determined by specific methods. A certificate of guarantee gives instructions for the use of these reference samples. (Atomindex citation 11:508579)

CNEN-RT/FI-78-17 PC **A02**/MF **A01**
Comitato Nazionale per l'Energia Nucleare, Rome (Italy).
Neutron Radiography Facility for Inspecting Reactor Fuel Elements at CSN Casaccia.
G. Pugnetti, G. Trezza, M. C. Ramorino, and M. Giannini. 1978, 13p
U.S. Sales Only.

This paper describes a facility installed at the Triga RC-1 reactor for the inspection of reactor fuel rods and pellets before and after irradiation. The facility has been designed and constructed in particular for the purposes of the Hot Cell Laboratory of the CSN Casaccia of the CNEN. (Atomindex citation 11:497171)

CONF-780506-(Sum.) PC **A09**/MF **A01**
Sandia Labs., Albuquerque, NM.
Packaging and Transportation of Radioactive Materials: Summary Program.
1978, 196p
Contract EY-76-C-04-0789
Symposium on packaging and transportation of radioactive materials, Las Vegas, NV, USA, 7 May 1978.

This document contains summaries or abstracts of reports presented at the Symposium on Packaging and Transportation of Radioactive Materials. Separate indexing has been performed on individual items presented at this conference. (ERA citation 05:028440)

CONF-780506-(V.1) PC **A23**/MF **A01**
Sandia Labs., Albuquerque, NM.
Packaging and Transportation of Radioactive Materials.
1978, 547p
Contract EY-76-C-04-0789
Symposium on packaging and transportation of radioactive materials, Las Vegas, NV, USA, 7 May 1978.

The presentations made at the Symposium on Packaging and Transportation of Radioactive Materials are included. The purpose of the meeting was for the interchange of information on the technology and politics of radioactive material transportation. Separate abstracts were prepared for individual items. (ERA citation 05:028441)

CONF-780506-(V.2) PC **A22**/MF **A01**
Sandia Labs., Albuquerque, NM.
Packaging and Transportation of Radioactive Materials.
1978, 519p
Contract EY-76-C-04-0789
Symposium on packaging and transportation of radioactive materials, Las Vegas, NV, USA, 7 May 1978.

The following topics are discussed in this volume: shielding and criticality; transportation accidents; physical security in transit; transport forecasting and logistics; transportation experience, operations and planning; regulation; standards and quality assurance; risk analysis; and environmental impacts. Separate abstracts are prepared for individual items. (ERA citation 05:028450)

DOE/ET/34036-T1 PC **A14**/MF **A01**
International Energy Associates Ltd., Washington, DC.
Study of the Potential Uses of the Barnwell Nuclear Fuel Plant (BNFP). Final Report.
25 Mar 80, 302p
Contract AC05-80ET34036

The purpose of this study is to provide an evaluation of possible international and domestic uses for the Barnwell Nuclear Fuel Plant, located in South Carolina, at the conclusion of the International Nuclear Fuel Cycle Evaluation. Four generic categories of use options for the Barnwell plant have been considered: storage of spent LWR fuel; reprocessing of LWR spent fuel; safeguards development and training; and non-use. Chapters are devoted to institutional options and integrated institutional-use options. (ERA citation 05:028433)

DOE/NE-0001/2F PC **A09**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Nuclear Energy.
Nuclear Proliferation and Civilian Nuclear Power. Report of the Nonproliferation Alternative Systems Assessment Program. Volume II. Proliferation Resistance.
Jun 80, 200p

The purpose of this volume is limited to an assessment of the relative effects that particular choices of nuclear-power systems, for whatever reasons, may have on the possible spread of nuclear-weapons capabilities. This volume addresses the concern that non-nuclear-weapons states may be able to initiate efforts to acquire or to improve nuclear-weapons capabilities through civilian nuclear-power programs; it also addresses the concern that subnational groups may obtain and abuse the nuclear materials or facilities of such programs, whether in nuclear-weapons states (NWS's) or nonnuclear-weapons states (NNW's). Accordingly, this volume emphasizes one important factor in such decisions, the resistance of nuclear-power systems to the proliferation of nuclear-weapons capabilities. (ERA citation 05:027229)

DOE/NE-0001/3F PC **A09**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Nuclear Energy.

Nuclear Proliferation and Civilian Nuclear Power. Report of the Nonproliferation Alternative Systems Assessment Program. Volume III. Resources and Fuel Cycle Facilities.
Jun 80, 197p

The ability of uranium supply and the rest of the nuclear fuel cycle to meet the demand for nuclear power is an important consideration in future domestic and international planning. Accordingly, the purpose of this assessment is to evaluate the adequacy of potential supply for various nuclear resources and fuel cycle facilities in the United States and in the world outside centrally planned economy areas (WOCA). Although major emphasis was placed on uranium supply and demand, material resources (thorium and heavy water) and facility resources (separative work, spent fuel storage, and reprocessing) were also considered. (ERA citation 05:027230)

DOE/NE-0001/4F PC **A14**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Nuclear Energy.
Nuclear Proliferation and Civilian Nuclear Power. Report of the Nonproliferation Alternative Systems Assessment Program. Volume IV. Commercial Potential.
Jun 80, 305p

This volume of the Nonproliferation Alternative Systems Assessment Program (NASAP) report provides time and cost estimates for positioning new nuclear power systems for commercial deployment. The assessment also estimates the rates at which the new systems might penetrate the domestic market, assuming the continuing viability of the massive light-water reactor network that now exists worldwide. This assessment does not recommend specific, detailed program plans and budgets for individual systems; however, it is clear from this analysis that any of the systems investigated could be deployed if dictated by national interest. (ERA citation 05:027231)

DOE/NE-0001/5F PC **A05**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Nuclear Energy.
Nuclear Proliferation and Civilian Nuclear Power. Report of the Nonproliferation Alternative Systems Assessment Program. Volume V. Economics and Systems Analysis.
Jun 80, 99p

This NASAP assessment considers the economics of alternative nuclear reactor and fuel-cycle systems in the light of possible patterns of uranium supply and energy demand, as well as the economic implications of improvng the proliferation resistance of the various systems. The assessment focuses on the costs of alternative nuclear technologies and the possible timing of their implementation, based on their economic attractiveness. (ERA citation 05:027232)

DOE/NE-0001/7F PC **A05**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Nuclear Energy.
Nuclear Proliferation and Civilian Nuclear Power. Report of the Nonproliferation Alternative Systems Assessment Program. Volume VII. International Perspectives.
Jun 80, 93p

The purpose of this volume is to assess the proliferation vulnerabilities of the present deployment of civilian nuclear-power systems within the current nonproliferation regime and, in light of their prospective deployment, to consider technical and institutional measures and alternatives which may contribute to an improved regime in which nuclear power could play a significant part. An assessment of these measures must include consideration of their nonproliferation effectiveness as well as their bearing upon energy security, and their operational, economic, and political implications. The nature of these considerations can provide some measure of their likely acceptability to various nations. (ERA citation 05:029003)

DOE-tr-114 PC **A10**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- and Festkoerperforschung.
Design, Irradiation, and Post-Irradiation Examination of the (U,Pu)C Fuel Pins of the Test Groups 6A and 6C.
H. Steiner, and P. Weimar. 212p
C KFK--2577, March 1978.Work performed under United States-W. Germany Fast Reactor Exchange Program.
U.S. Sales Only.

In the frame of the DeBeNe carbide program for the development of a carbide bundle 13 encapsulated gas-bonded fuel pins of the experimental group 6a and 6c were irradiated in the thermal flux of the FR2. The experiment was intended to yield first results on fuel swelling, fission gas release, and fuel/clad compatibility. The as-fabricated gaps between the fuel and clad were chosen extremely small (50, 90 mu m rad) so that already at low burnup relevant effects would appear. The fuel pins were irradiated to burnups of about 20, 50, and 70 MWd/kg M at linear rod powers of 800 to 1100 W/cm and clad outer temperatures of 450 to 600 exp 0 C. (ERA citation 05:028975)

FEI-900 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Estimation of Probability of Unsealing of a Rod Fuel Element Can with Unitial Cracks.
Yu. I. Likhachev, V. V. Popov, I. V. Kurov, and M. Ya. Khmelevskii. 1979, 21p
In Russian.
U.S. Sales Only.

Presented is the evaluation technique of probability of unsealing of a fuel element can of a fast energy reactor, with initial technological cracks with the help of the methods of destruction mechanics. It is shown that the probability of a fuel element unsealing in the vicinity of a welded joint in the process of reactor operation becomes sufficiently considerable, and the fact should be taken into consideration while estimating a fuel element working capability. (Atomindex citation 11:497201)

FEI-918 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Calculation Technique for Fuel Element Cans Temperature on Coolant Flow Rate Pulsations in Nuclear Reactors.
L. I. Dvortsova, V. Ya. Kumaev, M. P. Leonchuk, E. Kh. Pyl'chenkov, and Yu. E. Shvetsov. 1979, 16p
In Russian.
U.S. Sales Only.

Developed is the technique of numerical calculation for fuel element temperature fields in coolant flow rate pulsations in nuclear reactors. Semiempiric theories of stationary liquid flow in beams of rods were used to calculate the coefficients of turbulent heat and mass transfer. The technique for approximate consideration of the effect of damping of the flow rate pulsation amplitude with the height of the active zone is proposed. (Atomindex citation 11:497200)

GEAP-25163-2 PC **A05**/MF **A01**
General Electric Co., Schenectady, NY.
Demonstration of Fuel Resistant to Pellet-Cladding Interaction: Phase 2. Second Semiannual Report, July-December 1979.
H. S. Rosenbaum. Mar 80, 91p
Contract AC02-77ET34001

This program has as its ultimate objective the demonstration of an advanced fuel design that is resistant to the failure mechanism known as fuel pellet-cladding interaction (PCI). Two fuel concepts are being developed for possible demonstration within this program: (a) Cu-barrier fuel and (b) Zr-liner fuel. In the current report period the nuclear design of the demonstration was begun. The design calls for 132 bundles of barrier fuel to be inserted into the core of Quad Cities Unit 2 at the beginning of Cycle 6. Laboratory and in-reactor tests were started to evaluate the stability of Zr-liner fuel which remains in service after a defect has occurred which allows water to enter the rod. Results to date on intentionally defected fuel indicate that the Zr-liner fuel is not rapidly degraded despite ingress of water. (ERA citation 05:030623)

GJBX-109(80) PC **A02**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Interference Effects of Inorganic Ions in Natural Waters when Using the Scintrex UA-3 Uranium Analyzer.
N. E. Korte, and R. B. Chessmore. Jun 80, 15p
Contract AC13-76GJ01664

The effects of certain inorganic ions on uranyl luminescence measurements made with a Scintrex UA-3 uranium analyzer are described. Many anions and cations present in natural water systems quench uranyl luminescence. However, the concentration of any one ion is seldom sufficient to cause severe quenching, but the additive effects of several ions often result in a significant suppression of the signal. The method of additions can be used to overcome these interferences. (ERA citation 05:029378)

HEDL-SA-1702-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Experimental exp 233 U Nondestructive Assay with a Random Driver.
P. Goris. 1979, 16p CONF-791117-28
Contract AC14-76FF02170
ANS topical conference, Kiawah Island, SC, USA, 26 Nov 1979.

Nondestructive assay (NDA) of exp 233 U in quantities up to 15 grams containing 7 ppM exp 232 U age 2 years was investigated with a random driver. A passive singles counting technique showed a reproducibility within 0.2% at the 95% confidence level. This technique would be applicable throughout a process in which all of the exp 233 U had the same exp 232 U content at the same age. Where the exp 232 U content varies, determination of exp 233 U fissile content would require active NDA. Active coincidence counting utilizing a exp 238 Pu, Li neutron source and a plastic scintillator detector system showed a reproducibility limit within 15% at the 95% confidence limit. The active technique was found to be very dependent on the detector system resolving time in order to make proper random coincidence corrections associated with the high gamma activity from the exp 232 U decay chain. (ERA citation 05:030950)

HEDL-SA-1927 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
In-Reactor Fatigue Crack Propagation.
A. M. Ermi, D. A. Mervyn, and J. L. Straalsund.
Aug 79, 15p CONF-791102-158
Contract EY-76-C-14-2170
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979. Portions of document are illegible.

An in-reactor fatigue experiment is being designed to determine the effect of dynamic irradiation on the fatigue crack propagation (FCP) behavior of candidate fusion first wall materials. This investigation has been prompted by studies which show gross differences in crack growth characteristics of creep rupture specimens testing by postirradiation versus dynamic in-reactor methods. The experiment utilizes miniature center-cracked-tension specimens developed specifically for in-reactor studies. In the test, a chain of eight specimens, precracked to various initial crack lengths, is stressed during irradiation to determine crack growth rate as a function of stress intensity. Load levels were chosen which result in small crack growth rates encompassing a regime of the crack growth curve not previously investigated during irradiation studies of FCP. The test will be conducted on 20% cold worked 316 stainless steel at a temperature of 425 exp 0 C, in a sodium environment, and at a frequency of 1 cycle/min. Irradiation will occur in the Oak Ridge Research Reactor, resulting in a He/dpa ratio similar to that expected at the first wall in a fusion reactor. Detailed design of the experiment is presented, along with crack growth data obtained from prototypic testing of the experimental apparatus. These results are compared to data obtained under similar conditions generated by conventional test methods. (ERA citation 05:029297)

HEDL-SA-1984-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.

Effect of Material Variables on the Irradiation Performance of Boron Carbide.
J. A. Basmajian, and G. W. Hollenberg. 1980, 19p CONF-800609-6
Contract AC14-76FF02170
10. international symposium on effects of radiation on materials, Savannah, GA, USA, 3 Jun 1980.

Boron carbide pellets were fabricated with variations in material parameters. These pellets were irradiated in the Experimental Breeder Reactor-II (EBR-II) to determine the effect of these variations on the performance. Helium release from the material and swelling of the pellets are the primary measures of performance. It was determined that material with a smaller grain size released more helium and swelled less. The pellets with boron-to-carbon ratios greater than 4 to 1 did not perform well. Iron additions improved the performance of the material while density variations had little effect. (ERA citation 05:029054)

INIS-mf-4166 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Nuclear Industry - Challenges in Chemical Engineering.
S. Sen, N. S. Sunder Rajan, K. Balu, R. K. Garg, and L. G. K. Murthy. Jan 78, 12p
U.S. Sales Only.

As chemical engineering processes and operations are closely involved in many areas of nuclear industry, the chemical engineer has a vital role to play in its growth and development. An account of the major achievements of the Indian chemical engineers in this field is given with view of impressing upon the faculty members of the Indian universities the need for taking appropriate steps to prepare chemical engineers suitable for nuclear industry. Some of the major achievements of the Indian chemical engineers in this field are : (1) separation of useful minerals from beach sand, (2) preparation of thorium nitrate of nuclear purity from monazite, (3) processing of zircon sand to obtain nuclear grade zirconium and its separation from hafnium to obtain zirconium metal sponge, (4) recovery of uranium from copper tailings, (5) economic recovery of nuclear grade uranium from low grade uranium ores found in India, (6) fuel reprocessing, (7) chemical processing of both low and high level radioactive wastes. (Atomindex citation 09:375789)

INIS-mf-5263 PC **A02**/MF **A01**
Clarkson Coll. of Tech., Potsdam, NY.
Modeling of Equiaxed Grain Growth in Uranium Dioxide Fuels.
W. Baldewicz, A. R. Wazzan, and D. Okrent. 1978, 12p CONF-781022-133
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only.

Grain size is one of the most important parameters affecting fission gas swelling and release. Equations are developed that describe equiaxed grain growth in oxide fuel that has undergone previous irradiation (burnup) at temperatures too low to promote grain growth. The resulting expressions relate the rate af grain growth (at the new high temperature) to the percent burnup (or fission gas content) experienced during the prior low temperature irradiation. (Atomindex citation 11:497197)

INKA-Conf-79-410-003
PC **A02**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.).
Fuel Cycles.
E. Teuchert, and H. J. Ruetten. 1979, 3p CONF-7910162-3
In German.Meeting on high temperature reactors, Essen, F.R. Germany, 25 Oct 1979.
U.S. Sales Only.

For the pebble bed reactor there is a large field of variations as to the design of the fuel cycle. This results on one hand from the flexibility in the design of the fuel element and on the other from the possibility of variation in the operation of the reactor. The continuous method of refueling permits the residence time in the reactor of the fuel elements to be optimized without interruption. It further allows mixed charging of the reactor with fuel elements of different design and, if necessary, to recycle discharged elements without reprocessing, which has been demonstrated for 10 years in the Atomic Experimental Reactor AVR. These opportunities are taken advantage of for different fuel cycles to be optimized, compared with each other and for developing the leading facts for the commercial introduction of this reactor. (Atomindex citation 11:514660)

INR-1739/4/C/B PC **A02**/MF **A01**
Institute of Nuclear Research, Warsaw (Poland).
1/4 Technical Scale, Continuous Process of Obtaining the Ceramic Uranium Dioxide from Ammonium Polyuranates Containing Fluoride.
R. Wlodarski. 1977, 15p
In Polish.
U.S. Sales Only.

Based on the laboratory results, the 1/4 technical apparatus for the continuous reduction and defluorination of ammonium polyuranate containing fluoride was designed and constructed. The possibility of obtaining the ceramic uranium dioxide in a continuous process has been confirmed. The main part of the apparatus used in this process was the horizontal tubular oven with the extruder transporting material. (Atomindex citation 10:494089)

JAERI-M-8248 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Apparatus for Surface Treatment of U-Pu Carbide Fuel Samples.
S. Fukushima, Y. Arai, M. Handa, T. Ohmichi, and K. I. Shiozawa. May 79, 34p
In Japanese.
U.S. Sales Only.

Apparatus has been constructed for treating the surface of U-Pu carbide fuel samples for EPMA. The treatment is to clean off oxide layer on the surface, then coat with an electric-conductive material. The apparatus, safe in handling plutonium, operates as follows. (1) To avoid oxidation of the analyzing surface by oxygen and water in the air, series of cleaning and coating, i.e. ion-etching and ion-coating or ion-etching and vacuum-evaporation is done at the same time in an inert gas atmosphere. (2) Ion-etching is possible on samples embedded in non-electric-conductive and low heat-conductive resin. (3) Since the temperature rise in (2) is negligible, there is no deterioration of the samples. (Atomindex citation 11:508632)

JAPFNR-465 PC **A03**/MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan).
Measurements of Energy Release Rates of Fission Products (III). PNC-J--260-79-02-Tr.
M. Akiyama, K. Sakata, Y. Oka, S. An, and A. Furuhashi. Jul 79, 27p
Work performed under United States-Japanese Fast Reactor Exchange Program.
U.S. Sales Only.

The gamma-ray energy release rates of the fission-product have been measured for the fast-neutron fission of exp 235 U, exp 238 U,NU and exp 232 Th. The samples have been irradiated at fast neutron source reactor YAYOI of University of Tokyo. The gamma-ray spectra have been measured by NaI scintillation spectrometer. The response matrix of this spectrometer was made experimentally using the standard gamma-ray sources. The gamma-ray energy spectra have been obtained by unfolding the measured pulse height distributions. The gamma-ray energy release rates have been obtained to integrate the gamma-ray spectra. These experimental results of the gamma-ray energy release rates for those samples except exp 235 U sample agreed with the results of the summation calculations. (ERA citation 05:030648)

KY-704 PC **A02**/MF **A01**
Paducah Gaseous Diffusion Plant, KY.
Mass Spectrometer Memory Refinements Required for Ultra-Precise UF sub 6 Ratio Measurements.
R. F. Smith, and J. M. Jackson. 30 Jun 80, 24p
Contract W-7405-ENG-26

Empirical data demonstrate that a refined memory equation is applicable for precise isotopic ratio measurements of uranium hexafluoride by mass spectrometer. Ultra-high precision mass spectrometer ratio measurements of UF sub 6 are not appreciably limited by the ion source memory level provided appropriate slope and ratio corrections are applied to the memory factors. (ERA citation 05:029380)

LA-UR-80-642 PC **A02**/MF **A01**
New Mexico Univ., Albuquerque.
Structural Confinement and Safety Design of a Fast-Reactor Core.
F. D. Ju, and J. G. Bennett. 1980, 22p CONF-800804-15
Contract W-7405-ENG-36
ASME century 2 emerging technology conference, San Francisco, CA, USA, 10 Aug 1980.

In certain fast-reactor designs, the core is an assemblage of a large number of containers of long, hexagonal, hollow cylinders mounted vertically. These so-called hex-cans sit individually on coolant nozzles held down by their own weight, and are held as a group laterally at two levels by two constraint rings. In the analysis, it is observed that the large number of hex-cans and the distribution of the temperature field are such that the cross section of the reactor core can be treated as in a locally uniform dilatational field. An approximate equation was developed relating the plane deformation of a hollow hex cylinder to the global lateral pressure. The cylinder constitutive equation is then used to determine an equivalent stiffness for a solid hex cylinder that is to have the same deformation as the given hex-can. The entire planar core region is then analyzed as a homogeneous medium of the equivalent stiffness. The method was applied to the core confinement design for a fast reactor. The thermoelastic solution was then applied to a relatively simpler configuration than the actual case to give a measure of the lateral pressure. (ERA citation 05:030651)

NIIAR-3(362) PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Quantitative Measurements of Plutonium Distribution in Mixed Uranium-Plutonium Fuel by the Method of alpha -Radiography.
Yu. M. Golovchenko, V. S. Polenok, V. P. Smirnov, and A. V. Sukhikh. 1979, 16p
In Russian.
U.S. Sales Only.

The possibility of plutonium concentration measurement in the irradiated fuel element cores by alpha -radiography technique is substantiated. The performance of track detectors based on nitrocellulose which allow to optimize the conditions for exposure and development has been investigated. The analysis is presented of the statistical and systematic errors in determining plutonium concentrations with consideration for both the transplutonium element build-up and the neutron flux depression. The method has been tested with standard samples. (Atomindex citation 11:507887)

NUREG/CR-1375 PC **E03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
User's Manual for USINT: A Program for Calculating Heat and Mass Transfer in Concrete Subjected to High Heat Fluxes.
James V. Beck, and Richard L. Knight. May 80, 78p SAND-79-1694
Includes two sheets of 48X reduction microfiche.

This report is a user's manual for the intelligent application of PROGRAM USINT which is for calculation of heat and mass transfer in concrete subjected to high heating rates. The describing differential equations for energy, mass transfer of water and CO2 are provided along with appropriate boundary and initial conditions. The concrete is considered to contain two basic regions: wet and dry. In the wet region, steam, CO2 and liquid water may coexist but in the dry region there is no liquid water. There is also the possibility of a third region in which there is only liquid water and no gases. Decomposition of the concrete is treated by utilizing first order chemical kinetic equations; three reactions are assumed that treat evaporable water, chemically bound water and CO2. A modified Clausius-Clapeyron equation is used as the equation of state in the wet region. The finite difference representations of the partial differential equations are provided including details regarding several

models for Darcy's law for two phase flow. The energy equation and certain mass transfer equations are essentially parabolic for which reliable techniques are known; a general implicit procedure is employed that contains the Crank-Nicholson approximation. These procedures permit much larger time steps that the explicit procedure utilized by others. For each time step a very efficient analytical technique is provided for the solution of kinetic equations. A test case is included that also provides a comparison of the program with some test data. The temperatures, pressures and water release are compared and show excellent agreement. The complete program is available on a microfiche card that is included.

ORNL/TM-7100 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Thermal-Hydraulic/Heat Transfer Code Development for Sphere-Pac-Fueled LMFBRs.
D. G. Morris. Jun 80, 32p
Contract W-7405-ENG-26

Sphere-pac fuel has received much attention recently in light of the development of proliferation-resistant fuel cycles for the Fast Breeder Reactor Program in the United States. However, for sphere-pac fuel to be a viable alternative to conventional pellet fuel, a means to analyze the thermal behavior of sphere-pac-fueled pin bundles is needed. To meet this need, a thermal-hydraulic/heat transfer computer code has been developed for sphere-pac-fueled fast breeder reactors. The code, COBRA-3SP, is a modified version of COBRA-3M incorporating a three-region sphere-pac fuel pin model which permits fuel restructuring. With COBRA-3SP, steady-state and transient analysis of sphere-pac-fueled pin bundles is possible. The validity of the sphere-pac fuel pin model has been verified using experimental results of irradiated sphere-pac fuel. (ERA citation 05:028979)

ORNL/TM-7336 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
HTCAP-1: A Program for Calcuating Operating Temperatures in HFIR Target Irradiation Experiments.
M. J. Kania, and Jun 80, 87p
Contract W-7405-ENG-26

The thermal modeling code, HTCAP-1, calculates in-reactor operating temperatures of fueled specimens contained in the High Flux Isotope Reactor (HFIR) target irradiation experiments (HT-series). Temperature calculations are made for loose particle and bonded fuel rod specimens. Maximum particle surface temperatures are calculated for the loose particles and centerline and surface temperatures for the fuel rods. Three computational models are employed to determine fission heat generation rates, capsule heat transfer analysis, and specimen temperatures. This report is also intended to be a users' manual, and the application of HTCAP-1 to the HT-34 irradiation capsule is presented. (ERA citation 05:028964)

ORNL-5584 PC **A10**/MF **A01**
Oak Ridge National Lab., TN.
Irradiation Performance of HTGR Fuel Rods in HFIR Experiments HRB-11 and -12.
F. J. Homan, T. N. Tiegs, M. J. Kania, E. L. Long, Jr., and K. R. Thoms. Jun 80, 210p
Contract W-7405-ENG-26

Capsules HRB-11 and -12 were irradiated in support of development of weak-acid-resin-derived recycle fuel for the high-enriched uranium (HEU) fuel cycle for the HTGR. Fissil fuel particles with initial oxygen-to-metal ratios between 1.0 and 1.7 performed acceptably to full burnup for HEU fuel. Particles with ratios below 1.0 showed excessive chemical interaction between rare earth fission products and the SiC layer. (ERA citation 05:028962)

ORNL-5643 PC **A13**/MF **A01**
Oak Ridge National Lab., TN.
Gas-Cooled Reactor Programs: High-Temperature Gas-Cooled Reactor Base-Technology Program. Annual Progress Report for Period Ending December 31, 1979.
Jul 80, 290p
Contract W-7405-ENG-26

Progress in HTGR studies is reported in the following areas: HTGR chemistry; fueled graphite development; prestressed concrete pressure vessel development; structural materials; HTGR graphite studies; and evaluation of the pebble-bed HTR. (ERA citation 05:028963)

PAT-APPL-6-034 229 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Vibrating Fuel Grapple.
Patent Application,
A. J. Chertock, J. N. Fox, and R. B. Weissinger.
Filed 30 Apr 79, 11p
Contract EY-76-C-03-0893
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A reactor refueling method is described which utilizes a vibrating fuel grapple for removing spent fuel assemblies from a reactor core. It incorporates a pneumatic vibrator in the grapple head which allows additional withdrawal capability without exceeding the allowable axial force limit. The only moving part in the vibrator is a steel ball, pneumatically driven by a gas, such as argon, around a track, with centrifugal force created by the ball being transmitted through the grapple to the assembly handling socket. (ERA citation 05:032224)

PAT-APPL-6-055 209 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Between-Cycle Laser System for Depressurization and Resealing of Modified Design Nuclear Fuel Assemblies.
Patent Application,
Filed 5 Jul 79, 13p
Contract E(45-1)-2170
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A laser beam is used to puncture fuel cladding for release of contained pressurized fission gas from plenum sections or irradiated fuel pins. Exhausted fission gases are collected and trapped for safe disposal. The laser beam, adjusted to welding mode, is subsequently used to reseal the puncture holes. The fuel assembly is returned to additional irradiation or, if at end of reactivity lifetime, is routed to reprocess. The fuel assembly design provides graded cladding lengths, by rows or arrays, such that the cladding of each component fuel element of the assembly is accessible to laser beam reception. (ERA citation 05:032273)

PAT-APPL-6-064 592 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Infinite Blender for High Temperature Gas-Cooled Reactor Fuel Microspheres.
Patent Application,
M. G. Willey. Filed 7 Aug 79, 9p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An infinite blender that achieves a homogeneous mixture of fuel microspheres is provided. Blending is accomplished by directing respective groups of desired particles onto the apex of a stationary coaxial cone. The particles progress downward over the cone surface and deposit in a space at the base of the cone that is described by a flexible band provided with a wide portion traversing and in continuous contact with the circumference of the cone base and extending upwardly therefrom. The band, being attached to the cone at a narrow inner end thereof, causes the cone to rotate on its arbor when the band is subsequently pulled onto a take-up spool. As a point at the end of the wide portion of the band passes the point where it is tangent to the cone, the blended particles are released into a delivery tube leading directly into a mold, and a plate mounted on the lower portion of the cone and positioned between the end of the wide portion of the band and the cone assures release of the particles only at the tangent point. (ERA citation 05:032222)

PAT-APPL-6-077 821 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Liquid-Metal-Cooled Reactor.
Patent Application,
E. Hutter. Filed 21 Sep 79, 9p
Contract W-31-109-ENG-38
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A perforated depressor plate extending across the bottom of the instrument tree of a fast breeder reactor cooperates with a circular cylindrical metal bellows forming a part of the upper adapter of each core assembly and bearing on the bottom of the depressor plate to restrict flow of coolant between core assemblies, thereby reducing significantly the pressure differential between the coolant inside the core assemblies and the coolant outside of the core assemblies. Openings in the depressor plate are slightly smaller than the top of the upper adapter so the depressor plate will serve as a backup mechanical holddown for the core. In addition, coolant mixing devices and locating devices are provided attached to the depressor plate. (ERA citation 05:032223)

PAT-APPL-6-090 845 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Rapid Scanning System for Fuel Drawers.
Patent Application,
J. T. Caldwell, P. E. Fehlau, and S. W. France.
Filed 2 Nov 79, 13p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A nondestructive method for uniquely distinguishing among and quantifying the mass of individual fuel plates in situ in fuel drawers utilized in nuclear reactors is described. The method is both rapid and passive, eliminating the personnel hazard of the commonly used irradiation techniques which require that the analysis be performed in proximity to an intense neutron source such as a reactor. In the present technique, only normally decaying nuclei are observed. This allows the analysis to be performed anywhere. This feature, combined with rapid scanning of a given fuel drawer (in approximately 30 s), and the computer data analysis allows the processing of large numbers of fuel drawers efficiently in the event of a loss alert. (ERA citation 05:032268)

PAT-APPL-6-096 261 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Fabrication of Thorium Bearing Carbide Fuels.
Patent Application,
R. L. Gutierrez, R. J. Herbst, and K. W. R. Johnson. Filed 20 Nov 79, 14p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Thorium-uranium carbide and thorium-plutonium carbide fuel pellets have been fabricated by the carbothermic reduction process. Temperatures of 1750 exp 0 C and 2000 exp 0 C were used during the reduction cycle. Sintering temperatures of 1800 exp 0 C and 2000 exp 0 C were used to prepare fuel pellet densities of 87% and $>$ 94% of theoretical, respectively. The process allows the fabrication of kilogram quantities of fuel with good reproductibility of chemical and phase composition. (ERA citation 05:032274)

PATENT-4 163 689 Not available NTIS
Department of Energy, Washington, DC.
Vented Nuclear Fuel Element.
Patent,
L. N. Grossman, and A. I. Kaznoff. Filed 3 Dec 65, patented 7 Aug 79, 4p PAT-APPL-512 823 Supersedes PAT-APPL-512 823-65.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A nuclear fuel cell is described for use in a thermionic nuclear reactor in which a small conduit extends from the outside surface of the emitter to the center of the fuel mass of the emitter body to permit escape of volatile and gaseous fission products collected in the center thereof by virtue of molecular migration of the gases to the hotter region of the fuel. (ERA citation 05:032280)

PATENT-4 181 572 Not available NTIS
Department of Energy, Washington, DC.
Closure Head for a Nuclear Reactor.
Patent,
E. E. Wade. Filed 16 Jun 77, patented 1 Jan 80, 8p PAT-APPL-806 972
Supersedes PAT-APPL-806 972-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A closure head for a nuclear reactor includes a stationary outer ring integral with the reactor vessel with a first rotatable plug disposed within the stationary outer ring and supported from the stationary outer ring by a bearing assembly. A sealing system is associated with the bearing assembly to seal the annulus defined between the first rotatable plug and the stationary outer ring. The sealing system comprises tubular seal elements disposed in the annulus with load springs contacting the tubular seal elements so as to force the tubular seal elements against the annulus in a manner to seal the annulus. The sealing system also comprises a sealing fluid which is pumped through the annulus and over the tubular seal elements causing the load springs to compress thereby reducing the friction between the tubular seal elements and the rotatable components while maintaining a gas-tight seal therebetween. (ERA citation 05:032257)

PATENT-4 188 173 Not available NTIS
Department of Energy, Washington, DC.
Vertical Pump with Free Floating Check Valve.
Patent,
M. Lindsay. Filed 6 Oct 76, patented 12 Feb 80, 6p PAT-APPL-730 056
Supersedes PAT-APPL-730 056-76.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A vertical pump is described which has a bottom discharge with a free floating check valve disposed in the outlet plenum thereof. The free floating check valve comprises a spherical member with a hemispherical cage-like member attached thereto which is capable of allowing forward or reverse flow under appropriate conditions while preventing reverse flow under inappropriate conditions. (ERA citation 05:032256)

PATENT-4 189 398 Not available NTIS
Department of Energy, Washington, DC.
Nuclear Fuel Composition.
Patent,
A. L. Feild, Jr. Filed 15 Apr 65, patented 19 Feb 80, 6p PAT-APPL-448 546
Supersedes PAT-APPL-448 546-65.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A high temperature graphite-uranium base nuclear fuel composition containing from about 1 to about 5 weight percent rhenium metal is described. (ERA citation 05:032308)

PNL-TR-404 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services des Piles.
Dosimetry of Damage in the Simulated PWR Vessel of the ORNL Reactor.
A. Alberman, M. Benoist, and M. Thierry. 4 Jun 80, 25p
Contract AC06-76RL01830
C D.CEN/SPS/EAR/80/009, January 1980.

The measurements of damage fluences by the GAMIN and TUNGSTENE techniques have proven to be in very close agreement. Evaluation of the steel irradiation positions at 1/4 thickness shows that the damage effectiveness per unit of nickel flux is 20 to 30% higher than at the surveillance position, depending on the model. Nevertheless, any effect which may exist due to flux level (1/10) would predominate. Adjustment of the irradiation to obtain the same damage fluence (dpa) requires the ratio of durations to be 11. Measurement of the damage at the 3/4 thickness position, where the spectrum is of very low energy, reveals very high damage/activation ratios and ought to make it possible to validate the transport codes (ANISN type) in this geometry. (ERA citation 05:030632)

PPGM-L-171-78 PC **A03**/MF **A01**
Gama Research Centre, Jogyakarta (Indonesia).
Separation of Rare Earth from Uranium Part I: Chemical Separation of Uranium and Cerium.
I. Gitowati. 1978, 44p
In Indonesian.
U.S. Sales Only.

The use of hexone (methyl isobuthyl ketone) as organic solvent is studied for uranium and cerium extraction, as a preliminary to spent fuel reprocessing. In this experiment the effects of acidity and salting out agent is studied and discussed on the cerium extraction in the presence of dichromate ion, and uranium. These two factors have great influence in the extraction. Extraction is carried out by single batch system and the extraction results is analysed with spectrophotometric method. (Atomindex citation 11:507886)

RI-100 PC **A03**/MF **A01**
Radievyi Inst., Leningrad (USSR).
Investigation of Limiting Stage of Uranium Extraction with Tributyl Phosphate from Nitric Acid Solutions in Centrifugal Extractor.
M. F. Pushlenkov, and V. V. Zimenkov. 1979, 29p
In Russian.
U.S. Sales Only.

Heterogeneous reaction limiting the rate of uranium extraction with tributyl phosphate from 2 M nitric acid solution is investigated in flowing centrifugal extractor. The orders of this reaction are determined for extractant and NO sub 3- ions. The reaction mechanism is proposed. Activation energy of heterogeneous reaction is defined. The relation between reaction rate coefficient change for uranium and initial uranium concentration in 2 M nitric acid solution is established. The method for calculation of kinetic dependence of extraction efficiency on phase contact time is proposed. (Atomindex citation 11:507893)

18K. Reactor Physics

NUREG/CR-1547 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Criticality Experiments with Subcritical Clusters of 2.35 Wt% and 4.31 Wt% 235U Enriched UO2 Rods in Water at a Water-to-Fuel Volume Ratio of 1.6,
S. R. Bierman, and E. D. Clayton. Jul 80, 60p
PNL-3314

The results from the fourth in a series of criticality experiments, are presented in this paper. This fourth set of experiments involve clusters of either 2.35 wt% or 4.31 wt% 235U enriched UO2 fuel rods immersed in water as in previous experiments but a neutron moderation approximating that found typically in Boiling Water Reactor and Pressurized Water Reactor type fuel assemblies. (Previous experiments were performed near optimum neutron moderation). The critical separation between multiple subcritical fuel assemblies, both with and without fixed neutron poisons, was determined.

18L. Reactors (Power)

NUREG/CP-0014-V-1 PC **A99**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Regulatory Research.
Proceedings of the ANS/ASME/NRC International Topical Meeting on Nuclear Reactor Thermal-Hydraulics Held at Saratoga Springs, New York on October 5-8, 1980. Volume 1. PWR and BWR Reactor-Plant Performance Analysis and Containment Technology.
R. Ross Rippel. Oct 80, 814p
Sponsored in part by American Nuclear Society, Washington, DC., and American Society of Mechanical Engineers, New York. Prepared in cooperation with Rensselaer Polytechnic Inst., Troy, NY. See also Volume 2, NUREG/CP-0014-V-2.

Technical papers and invited lectures presented at the 1980 International Topical Meeting on Nuclear Reactor Thermal-Hydraulics are presented. The thermal-hydraulics of pressurized water reactors, boiling water reactors, liquid metal cooled fast breeder reactors, and high temperature gas cooled fast breeder reactors, and high temperature gas cooled reactors including pebble bed reactors are covered. There are sessions on reactor blowdown and refill, reactor containment technology and reactor-plant components. Basic mechanisms of two-phase flow are presented in sessions on critical flow, instrumentation, critical heat flux and reflood, entrainment and droplet deposition. There is also a special session on mathematical methods.

NUREG/CP-0014-V-2 PC **A99**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Regulatory Research.
Proceedings of the ANS/ASME/NRC International Topical Meeting on Nuclear Reactor Thermal-Hydraulics Held at Saratoga Springs, New York on October 5-8, 1980. Volume 2. Fundamental Aspects of Two-Phase Flow and Boiling Heat Transfer,
R. Ross Rippel. Oct 80, 793p
See also Volume 1, NUREG/0014-V-1, and Volume 3, NUREG/CP-0014-V-3. Sponsored in part by American Nuclear Society, Washington, DC., and American Society of Mechanical Engineers, New York. Prepared in cooperation with Rensselaer Polytechnic Inst., Troy, NY. Dept. of Nuclear Engineering.

Technical papers and invited lectures presented at the 1980 International Topical Meeting on Nuclear Reactor Thermal-Hydraulics are presented. The thermal-hydraulics of pressurized water reactors, boiling water reactors, liquid metal cooled fast breeder reactors, and high temperature gas cooled reactors including pebble bed reactors are covered. There are sessions on reactor blowdown and refill, reactor containment technology and reactor-plant components. Basic mechanisms of two-phase flow are presented in sessions on critical flow, instrumentation, critical heat flux and reflood, entrainment and droplet deposition. There is also a special session on mathematical methods.

NUREG/CP-0014-V-3 PC **A99**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Regulatory Research.
Proceedings of the ANS/ASME/NRC International Topical Meeting on Nuclear Reactor Thermal-Hydraulics Held at Saratoga Springs, New York on October 5-8, 1980. Volume 3. LMFBR and HTGR Advanced Reactor Concepts and Analysis Methods,
R. Ross Rippel. Oct 80, 860p
See also Volume 2, NUREG/CP-0014-V-2. Sponsored in part by American Nuclear Society, Washington, DC., and American Society of Mechanical Engineers, New York. Prepared in cooperation with Rensselaer Polytechnic Inst., Troy, NY. Dept. of Nuclear Engineering.

Technical papers and invited lectures presented at the 1980 International Topical Meeting on Nuclear Reactor Thermal-Hydraulics are presented. The thermal-hydraulics of pressurized water reactors, boiling water reactors, liquid metal cooled fast breeder reactors, and high temperature gas cooled reactors including pebble bed reactors are covered. There are sessions on reactor blowdown and refill, reactor containment technology and reactor-plant components. Basic mechanisms of two-phase flow are presented in sessions on critical flow, instrumentation, critical heat flux and reflood, entrainment and droplet deposition. There is also a special session on mathematical methods.

PATENT-4 192 714 Not available NTIS
Department of Energy, Washington, DC.
Reactor Safety Method.
Patent,
L. J. Vachon. Filed 7 Dec 66, patented 11 Mar 80, 4p PAT-APPL-600 695
Supersedes PAT-APPL-600 695-66.

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to safety means for preventing a gas cooled nuclear reactor from attaining criticality prior to start up in the event the reactor core is immersed in hydrogenous liquid. This is accomplished by coating the inside surface of the reactor coolant channels with a neutral absorbing material that will vaporize at the reactor's operating temperature. (ERA citation 05:032307)

18M. Reactors (Non-Power)

ILL-RA-1977 MF **A01**
Institut Max von Laue - Paul Langevin, Grenoble (France).
ILL Annual Report 1977.
1p
In French, English.
Microfiche copies only. U.S. Sales Only.

In 1977 the three major functions of ILL continued to be performed (provision of neutron beams at the high flux reactor, development of advanced instrumentation, workshop organization). An integrated programme of improvement to the existing instruments and of new instrument construction, was carried out. A high priority was given to finishing instruments in the course of construction and both the ultra cold neutron source, PN5, and spin echo spectrometer, IN11, came into operation. No new instrument construction was started; even so, the completion of D18 (the interferometer) and IN12 (the cold three-axis machine) was delayed until 1978. Some advantage was taken of the delay to implement a new system of three-axis drive mechanics and interfacing electronics. This report gives a survey of the state of the experimental facilities at ILL and the scientific work carried out in 1977, and of the main technical and administrative activites of the Institute. (Atomindex citation 10:463852)

UTNL-R-0062 PC **A08**/MF **A01**
Tokyo Univ. (Japan). Nuclear Engineering Research Lab.
Report of the Research Results with Joint-Use Facilities in Fiscal Year 1977.
1978, 161p
In Japanese.
U.S. Sales Only.

In the Nuclear Engineering Research Laboratory, the University of Tokyo, the fast neutron source reactor 'Yayoi', the linac and the fusion-reactor blanket facility are jointly used by educational institutions. Research results from the joint uses of the facilities in fiscal 1977 are presented in individual summaries: (on-pile) irradiation, reactor physics and engineering, etc., (off-pile) equipment and component techniques, etc., (linac) operation, etc., with these joint uses, unique works are intended in a resonable way. (Atomindex citation 10:446346)

18N. Snap Technology

DOE/ET/33021-T1 PC **A02**/MF **A01**
Fairchild Space and Electronics Co., Germantown, MD.
Design Evolution and Verification of the General-Purpose Heat Source.
A. Schock. 11p
Contract AC02-77ET33021

The General-Purpose Heat Source (GPHS) is a radioisotope heat source for use in space power systems. It employs a modular design, to make it adaptable to a wide range of energy conversion systems and power levels. Each 250 W module is completely autonomous, with its own passive safety provisions to prevent fuel release under all abort modes, including atmospheric reentry and earth impact. Prior development tests had demonstrated good impact survival as long as the iridium fuel capsules retained their ductility. This requires high impact temperatures, typically above 900 exp 0 C and reasonably fine grain size, which in turn requires avoidance of excessive operating temperatures and reentry temperatures. These three requirements - on operating, reentry, and impact temperatures - are in mutual conflict, since thermal design changes to improve any one of these temperatures tend to worsen one or both of the others. This conflict creates a difficult design problem, which for a time threatened the success of the program. The present paper describes how this problem was overcome by successive design revisions, supplemented by thermal analyses and confirmatory vibration and impact tests; and how this may be achieved while raising the specific power of the GPHS to 83 W/lb, a 50% improvement over previously flown radioisotope heat sources. (ERA citation 05:028557)

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A088 068/2 MF **A01**
Army Combined Arms Studies and Analysis Activity Fort Leavenworth KS
Ammunition Resupply Model. Volume II. Programmers Manual.
Final rept.,
Donald J. Remen, Robert B. Clarke, and James Fox. Mar 80, 193p Rept no. CASAA-TR-2-80-VOL-2
See also Volume 1, AD-A084 830.
Availability: Microfiche copies only.

ARM (Ammunition Resupply Model) is an interactive/batch representation of Class V flow from the corps support area (CSA) to the weapon. The model receives a file consisting of a record of ammunition usage by unit by ammunition type from a combat simulation (presently, the simulation being used is METRO). The ARM using a preloaded data base of ammunition handling procedures and capabilities represents the flow of ammunition as it would have occurred within the battle. The unit status over time is indicative of the capability of the system to supply ammunition to the weapons and the reasonableness of the firing doctrine used within the attrition simulation given the ammunition resupply system carrying capabilities. ARM is written in FORTRAN IV and is machine independent with the exception of the subroutine that reads the file created by the attrition model. (Author)

AD-A088 223/3 PC **A04**/MF **A01**
Naval Surface Weapons Center Silver Spring MD
Detonations and Molecular Electronic Structure of Explosives: Theory and Its Application to (NO+)n.
Technical rept. Oct 77-Dec 78,
Richard D. Bardo. 30 May 80, 57p Rept no. NSWC/TR-79-175

The theory of the electronic structure of molecular systems is discussed. It is suggested that certain electronic excited states are diminished in energy during compression, and that intersections of ground and excited state potential energy surfaces occur, thereby creating much lower activation energy barriers and greatly enhancing reaction rates. The molecular system (NO+)n is treated as a prototype explosive system. Ab initio and semiempirical calculations on the ground and excited electronic states of (NO+)n are presented. Intersections of the surfaces are seen to occur, suggesting that at high compressions the activation energy for bond scission may be substantially reduced. It is also shown that the changes in excitation energies depend primarily on the interactions of two or three NO(+) molecules. Which suggests an enormous simplification in the study of excited states. (Author)

AD-A088 361/1 PC **A03**/MF **A01**
General Electric Co Santa Barbara CA DASIAC
Review of Large HE Charge Early-Time Detonation Anomalies.
Final rept. 1 Nov 78-31 Dec 79,
Jacques E. Schoutens. 31 Dec 79, 50p DASIAC-SR-182, AD-E300 887
Contract DNA001-79-C-0081

Early-time high-explosive (HE) anomalies from large charges have been a problem to weapon effects experimenters for nearly three decades. It is the unpredictability and near unsuppressibility of these anomalies which are the source of the problem. This Special Report summarizes what is known to date about HE detonation anomalies for charges ranging in yield from 0.25 gm to 500 tons. For source material, extensive use was made of DASIAC Library reports and films, of available papers published in the open literature, and of the National Technical Information Services' (NTIS) computerized library search. This report has been kept purposefully brief and self-contained to provide a useful review and reference to the subject. Following an introduction to the subject of detonation anomalies and a brief description of the literature and film searches, the classification and origin of the types of anomalies observed in field experiments and the laboratory are clearly described, and a discussion is provided on the effects of anomalies on field experiments. The last section, while not presenting conclusions and recommendations, discusses a nubmer of methods that have been tried in an attempt to suppress detonation anomalies: it is indicated that anomalies of various types are an inherent part of HE detonations.

AD-A088 408/0 PC **A03**/MF **A01**
Southwest Research Inst San Antonio TX
Evaluation of Small Arms Propellants in Loading Hopper.
Final rept.,
E. P. Bergmann, R. M. Rindner, and W. O. Seals. Aug 80, 42p ARLCD-CR-80013, AD-E400 458
Contract DAAK10-78-C-0064

The U. S. Army is currently involved in a production base modernization program under which many new explosive and propellant production facilities are being build and others are being renovated and modernized. Significant attention is being given to both increased safety and production efficiencies for the in-process operations. Small arms ammunition plants use hoppers for in-process storage of propellants in ammunition loading operations. As long as the height of the propellant in the hopper is below a 'critical' level, any accidental burning initiation of the propellant will not result in either an explosion or a detonation of the propellant. This program was structured to verify that the in-process storage heights of IMR 8208, WC 818 and WC 844 propellants were below the 'critical' height. Hoppers and feed pipes were fabricated to be representative of the in-plant hopper/feed pipe configurations, as specified by ARRADCOM drawings.

AD-A088 411/4 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
High Viscosity Liquid Payload Yawsonde Data for Small Launch Yaws.
Final rept.,
W. P. D'Amico, and W. H. Clay. Jun 80, 42p ARBRL-MR-03029, AD-E430 480
Supersedes Rept. no. ARBRL-IMR-649.

Eight projectiles filled with high viscosity liquid payloads were tested at Wallops Island, Virginia, on 16 October 1978. These shells were instrumented with fuze-configured yawsondes and were filled with liquid payloads whose viscosities were three to five orders of magnitude larger than that of water. Unstable flights occurred for launch yaws as small as 2.5 degrees for the high viscosity liquid payloads. This type of flight instability cannot be predicted by available liquid-filled projectile theories and represents a hazard to new payload concepts that may employ such liquids.

AD-A088 414/8 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
XM803 Yawsonde Reduction.
Final rept.,
W. P. D'Amico. Jun 80, 38p ARBRL-MR-03028, AD-E430 478
Supersedes Rept. no. ARBRL-IMR-645.

Twelve yawsonde-instrumented XM803 projectiles were tested at Dugway Proving Ground, Utah, on 13 June 1978. All projectiles exhibited stable flights for high subsonic launch conditions when fired from the M198 and M109A1 systems. The XM803 is a member of the 155mm M483A1 family of shell and carries red phosphorous. (Author)

LA-8436-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
X-0298: A Rubber-Bonded PBX.
T. M. Benziger, E. D. Loughran, and R. K. Davey. Jul 80, 16p
Contract W-7405-ENG-36

The properties of X-0298, a rubber-bonded HMX composition, are described. It is a high explosive of exceptional stability, an effect of its novel binder system (a styrene-ethylenebutylene-styrene block copolymer extended with a paraffinic oil). It appears particularly suited for applications that require extended service at elevated temperatures. (ERA citation 05:031108)

MHSMP-80-32 PC **A02**/MF **A01**
Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX.
Accuracy and Precision of Analysis of Phenoxy in TATB/Phenoxy Compositions.
B. R. Richardson. Jul 80, 9p
Contract AC04-76DP00487

A method for determining the phenoxy content of TATB/phenoxy formulations was applied in order to test the accuracy and precision of the procedure. The development of an optimum conditions variance control chart for this analysis is outlined and the results shown. The accuracy and precision of the method were found to be acceptable for certification of TATB/phenoxy lots. (ERA citation 05:031109)

PB80-853575 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electroexplosive Devices. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 12p NERACEI NT0825
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, production, and application of initiators and electroexplosive devices. Also included is and analysis of various solid explosives, delay initiators, and other apparatus related to electroexplosive devices. (Contains 042 citations.)

PB80-853690 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electroexplosive Devices. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 70p NERACIAANT0825
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the design, production, and application of initiators and electroexplosive devices. Also included is an analysis of various solid explosives, delay initiators, and other apparatus related to electroexplosive devices. (Contains 062 citations.)

19D. Explosions, Ballistics, and Armor

AD-A088 219/1 PC **A02**/MF **A01**
Naval Weapons Center China Lake CA
A Preliminary Analysis of Space Blast.
Technical memo.,
Robert G. S. Sewell. Oct 78, 11p NWC-TM-3664, GIDEP-E149-1603

Many people feel there is no blast capability of a weapon in the space environment of a vacuum. The purpose of this report is to clarify the thinking on this point, and to show that an explosive weapon operating in a vacuum would produce extensive damage due to blast-like effects. It is true that in a vacuum there will be no shock or air blast as would be experienced by a detonation of an explosive charge in air. But what happens is that the near-field effects zone, which is the zone directly affected by the explosion products, extends to infinity and all of the energy and momentum of the explosive remains in the products of the explosives until a target is encountered. (Author)

AD-A088 239/9 PC **A03**/MF **A01**
Naval Weapons Center China Lake CA
Blast Overview and Near-Field Effects.
Technical memo.,
Robert G. S. Sewell. Feb 79, 28p NWC-TM-3754, GIDEP-E149-1265

This report covers material presented at a workshop on high explosives incendiary modeling and was intended to set the stage for presentations to follow on the effects of multiple fragments and their effects on aircraft components. In this setting, blast is described as a ubiquitous damage agent associated with many conventional and unconventional (FAE and nuclear) weapons. The damage produced in an aircraft target by a high explosive incendiary projectile is generally quite localized in its effect. The effects are limited to a zone quite close to the projectile at its time of detonation, and the damages are produced by the combined action of the fragments from the projectile, the products of explosion, and also from the air blast produced. Two convenient divisions of blast are classified as internal and external. Reference to internal blast is when the damage is applied inside the structure of interest, and external blast is when the damage agent is applied to the exterior surface of the structure of interest. (Author)

AD-A088 419/7 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Structures Lab
Propagation of Explosive Shock through Rubble Screens.
Final rept.,
Jerry W. Brown, Donald W. Murrell, and John H. Stout. Jul 80, 32p Rept no. WES/MP/SL-80-7

This report describes tests conducted on shock transmitted through rubble screens from explosions on the top of the screens. The results are compared with shock transmitted through slabs and through free soil. There appears to be little difference in shock transmission in the three cases. (Author)

AD-A088 420/5 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Structures Lab
Development of a Program for Computer-Based Resistance Analysis (COBRA).
Final rept.,
James B. Cheek, Jr. Jul 80, 97p Rept no. WES/TR/SL-80-5

This report describes the development of a computer-based approach to evaluating the hardness of structures subjected to attack by nonnuclear weapons. The program has the following features: It introduces a normal random change in projectile impact point with respect to aim point. This models the targeting uncertainty of weapon delivery systems; It accounts for both blast- and fragment-induced damage for each shot; It models the cumulative damage and the resultant increase in vulnerability produced by a series of shots (an attack); It considers the redundancy of structural elements and approximately models their structural behavior with respect to blast-induced failure; It models the curved path (J hook) of projectiles in soil; It provides for proximity, contact, and delay fusing; It models the vulnerability of personnel protected by structures and provides for user-specified vulnerability graphs for components protected by structures; The main objective of this program development effort is to provide the designer of protective structures and the military strategist with specifications which relate hardness to the number of shots per attack and the number of attacks. By this means, it is anticipated that more economical (time or money or both) designs can be developed for various combinations of shots per attack, numbers of attacks, and weapon intensity. In like manner, a more real-world-oriented assessment of 'enemy' structures will result from assessing hardness in terms of the probability of surviving various numbers of shots from a particular weapon system. (Author)

19E. Fire Control and Bombing Systems

AD-A087 987/4 PC **A02**/MF **A01**
Human Engineering Lab Aberdeen Proving Ground MD
A Summary of Capabilities of Artillery Forward Observers Equipped with Laser Rangefinders.
Final rept.,
William J. Dousa, Jr. May 80, 16p Rept no. HEL-TM-9-80

The purpose of the report is to show the need for a tripod for use with an artillery rangefinder. The data summarized in this report show that a laser rangefinder mounted on an azimuth measuring, aided tracking tripod increases a forward observer's ability to locate targets and to deliver fire-for-effect and adjust fire effectively. (Author)

AD-A088 407/2 PC **A03**/MF **A01**
Army Armament Research and Development Command Dover NJ Fire Control and Small Caliber Weapon Systems Lab
Integrated Optics for Army Fire Control Systems.
Interim rept. Oct 78-Sep 79,
J. M. Zavada, H. A. Jenkinson, and R. G. Hunsperger. Aug 80, 27p ARSCD-TR-80007, AD-E400 461

Integrated optics refers to the integration of guided-wave optical components such as waveguides, couplers, modulators, sources, and detectors into miniature sensing/signal processing circuits. Since these circuits operate directly on an optical beam, they are capable of processing greater amounts of information than conventional integrated electronic circuits, and are virtually secure and immune to countermeasures. Consequently, integrated optical circuits hold vast potential for improving the performance of Army Fire Control Systems such as laser radars, beamriders, smart munitions, and novel sensors. Ion implantation of doped semiconductor substrates is a highly promising technique for the fabrication of individual optical components as well as monolithic integrated circuits. Since Army requirements demand lower carrier frequencies, the use of ion implantation to form infrared guided wave devices is discussed. Prior work in this area is summarized, and basic problems relating to the formation of infrared optical components are identified. Results of wave-guiding a helium neon laser beam in thin aluminum oxide films are presented as preliminary experimental procedures to be followed in the infrared.

PAT-APPL-6-168 987 PC **A02**/MF **A01**
Department of the Navy Washington DC
Dual Dependent Stores Ejector Assembly for Angular Rate and Position Control.
Patent Application,
Gerald E. Kovalenko. Filed 14 Jul 80, 18p AD-D007 418/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A dual dependent ejector assembly for ordnance stores on aircraft, etc. which imparts to the store,

in addition to normal ejecting forces, an angular rate of movement and/or an angular attitude. The ejecting forces are applied at fore and aft locations on the store (e.g., bomb) by piston-like ejectors which are actuated by hydraulic circuitry. Dual dependency is achieved by the action of a stepped piston which transmits equal volumes of fluid from two source chambers to each of the two ejectors. A third chamber in which the stepped piston operates supplements the fluid supplied to the ejectors by the first two chambers by means of a valve distribution system which includes two pressure responsive spool valves. (Author)

19F. Guns

AD-A088 535/0 PC **A03**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Design and Construction of a Refined Step Threading Machine for 175mm and 8 In. Breech Rings.
Memorandum rept.,
C. H. Rose. Jun 80, 28p ARLCB-MR-80022, AD-E440 075

This report details the engineering design and production application of a special purpose machine, tooled to produce internal step threads (constant lead thread on two distinct diameters) on 8 in M201 breech rings. The machine, using oscillating motion and a full thread form tool, produces the full thread on each sector, then is indexed in turn to the next sectors until all eight are completed. The use of this equipment has reduced the floor to floor time from 13 hours to 4 hours while producing better thread finishes and more accurate dimensional sizes.

AD-A088 541/8 PC **A03**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Stress Analysis of an Overloaded Breech Ring.
Technical rept.,
P. C. T. Chen, and Y. F. Cheng. Jun 80, 33p ARLCB-TR-80018, AD-E440 077

A two-dimensional model of the meridian section of a breech ring was made of a photoplastic material which had been calibrated optically and mechanically. The location and magnitude of the maximum fillet stress in an overloaded breech ring was determined experimentally and numerically. Residual stress resulting from elastic unloading was calculated. The comparison between numerical and experimental results is satisfactory.

19G. Rockets

N80-29408/5 PC **A04**/MF **A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Study on Nose Cone Development.
Final Report.
R. Henkel, G. Maier, H. Meier, and W. Schrieder. Oct 79, 64p BMFT-FB-W-79-20, ISSN-0170-1339 Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

In response to a demand for a universal nose cone design for sounding rocket applications various split type nose cones with different separation mechanisms, presently available on the market, were studied. The study includes a comparison of different construction principles regarding minimal disturbance and spin reduction on takeoff. Results show that a nose cone for universal application is not a reasonable concept, since the requirements vary too greatly depending on the mission.

19H. Underwater Ordnance

AD-A088 290/2 PC **A03**/MF **A01**
Environmental Research Inst of Michigan Ann Arbor
Record of Second Meeting of Expert Working Group on Minefield Detection Technology.
Technical rept.,
Irvin J. Sattinger. Mar 79, 34p Rept no. ERIM-138300-14-T
Contract DAAK70-78-C-0198

The second meeting of the Expert Working Group on Minefield Detection Technology was held at MERADCOM, Ft. Belvoir, Virginia on 27-28 February 1979. Presentations were made by MERADCOM, the Environmental Research Institute of Michigan and Braddock, Dunn, and McDonald to the Expert Working Group on the current status and future plans for the project. At the end of the presentations, an Executive session of the Expert Working Group was held. Major conclusions and recommendations of the meeting included the following. The study is to exclude considerations of sensors emplaced in advance of hostilities and scatterable mines. The potential of multispectral scanners, passive IR sensors, wet chemistry photography, SIGINT, and mine neutralization was discussed. Recommendations were made for further review by MERADCOM and by individual members of the EWG of the overall coordination of the program, details of the analytical methodology being developed by BDM, and data on the RF-4C photographic system for use as a technical example in operational analysis. (Author)

20. PHYSICS

20A. Acoustics

AD-A088 145/8 PC **A02**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
Long-Range Acoustic Transmission in the Northwest Atlantic.
Michael G. Brown, Walter H. Munk, John L. Spiesberger, and Peter F. Worcester. 19 Oct 79, 9p
Contract N00014-75-C-0152
Pub. in Jnl. of Geophysical Research, v85 nC5 p2699-2703, 20 May 80.

No abstract available.

AD-A088 146/6 PC **A02**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
Stability and Identification of Ocean Acoustic Multipaths,
John L. Spiesberger, Robert C. Spindel, and Kurt Metzger. 5 Nov 79, 10p
Contract N00014-75-C-0152
Pub. in Jnl. of Acoustical Society of America, v67 n6 p2011-2017 Jun 80.

No abstract available.

AD-A088 160/7 PC **A07**/MF **A01**
Transportation Systems Center Cambridge MA
Detection and Assessment of Secondary Sonic Booms in New England.
Final rept.,
Edward J. Rickley, and Allan D. Pierce. May 80, 137p TSC-FAA-80-10, FAA-AEE-80-22

This report documents the results of a secondary sonic boom detection and assessment program conducted by the U.S. Dept. of Transportation, Transportation Systems Center in New England during the summer of 1979. Measurements of both acoustic and infrasonic signals were made. Measurement data and ray trace computations demonstrate that the secondary sonic booms frequently reported by New England residents are created by the Concorde passenger flight off the New England coast enroute to Kennedy Airport in New York City. Signal amplitudes show side fluctuations from flight to flight, from day to day, and with geographic locations. A brief set of measurements made in Applebachsville PA, show a similar day to day variability and are correlated with Concorde flights into Dulles Airport in Virginia.

AD-A088 205/0 PC **A03**/MF **A01**
Bolt Beranek and Newman Inc Canoga Park CA
Computer Program to Add NOISEMAP Grids of Different Spacings.
Final rept.,
Harry Seidman. Apr 80, 30p AMRL-TR-79-88
Contract F33615-79-C-0501

Noise data for normal aircraft operations are usually calculated by the NOISEMAP computer program at grid points 1000 feet apart. Data from blast noise and supersonic aircraft are calculated at grid points several thousand feet apart. This report describes a computer program that was written to allow the two sets of data to be combined. (Author)

AD-A088 285/2 PC **A04**/MF **A01**
Bolt Beranek and Newman Inc Canoga Park CA
Study of Lateral Excess Sound Attenuation as Determined from Far Part 36 Aircraft Noise Certification Measurements.
Technical rept.,
Dwight E. Bishop, and Jane M. Beckmann. Jul 80, 58p BBN-4225, AFAMRL-TR-80-65
Contract F33615-79-C-0501

This report presents information on the variation of the lateral excess attenuation as a function of elevation angle. Lateral excess attenuation represents the differences between the noise levels measured directly underneath the aircraft and to the side of the aircraft, after adjustment for differences in distance and air absorption. This information was developed from analysis of 'takeoff' and 'sideline' noise data acquired during FAR 36 civil aircraft noise certification tests. The study shows that useful excess attenuation information can be developed from aircraft certification data provided steps are taken to locate sideline positions so that measurements adequately cover the range of low elevation angles. The measured excess attenuation values show trends with frequency that are consistent with measurements observed in recent Air Force tests in the frequency range up to about 400 Hz. Larger excess attenuation values were measured at higher frequencies for reasons that are not known at this time. The perceived noise level (PNL), and A-level (AL), curves for each of the aircraft were generally similar in shape however the excess attenuation values for PNL were slightly larger than the AL values, with the difference most pronounced for the C-130H aircraft.

AD-A088 369/4 PC **A03**/MF **A01**
Texas Univ At Austin Applied Research Labs
Signal Processing Aspects of Nonlinear Acoustics.
Technical rept.,
T. G. Muir, and Tommy G. Goldsberry. 7 Jul 80, 37p Rept no. ARL-TR-80-38
Contract N00014-75-C-0161

The topic of nonlinear acoustics has been included at previous NATO study institutes going back to 1966. The first treatment, by Berktay, speculated on the possibilities nonlinear effects might offer. In 1968, Mellen illustrated some of these possibilities through laboratory tank experiments. Berktay returned in 1972 to present some engineering models for the design of parametric sources. In 1976, Bjorno presented a survey of theoretical and experimental results on parametric arrays developed at several laboratories. Today, research and development in nonlinear acoustics has gravitated toward applications. The present paper therefore addresses applications with a view towards outlining the unique features of nonlinear arrays, especially with regard to signal processing. Both nonlinear sources and receivers will be discussed.

AD-A088 418/9 PC **A06**/MF **A01**
Naval Research Lab Washington DC
Liquid Surface Levitation Holography. Part 1. Theoretical Analysis.
Interim rept.,

Alfred V. Clarke, Jr. 11 Aug 80, 109p Rept no. NRL-8205

The liquid surface levitation holography system has been analyzed, paralleling analyses by previous investigators but treating several new areas. Depth of focus and depth of field of the acoustic lens system are considered, accounting for differences in the acoustic properties of the imaging and object-tank fluids. The mechanical properties of the minitank membrane are shown to have three significant effects: multiple internal reflections of acoustic waves are enhanced in the minitank, which causes the minitank transfer function to become oscillatory for large imaging-fluid depths; deformation of the membrane can degrade the focused acoustic image; and coupling between motions of the membrane and of the liquid surface occurs at low spatial frequencies. Possible coupling between the acoustic field quantities (pressure, density, and velocity) and the surface levitation field is shown to be negligible for a typical system. The low-spatial-frequency deformation (bulge) of the liquid surface is calculated for typical system parameters. The natural frequencies of oscillation of the surface are much less than the rate at which the surface is excited. Consequently the bulge builds up to a steady-state value.

N80-30154/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Numerical Techniques in Linear Duct Acoustics.
Status Report.
K. J. Baumeister. 1980, 23p NASA-TM-81553, E-513
Proposed for Presentation at Winter Ann. Meeting of Asme Chicago, 17-21 Nov. 1980.

Both finite difference and finite element analyses of small amplitude (linear) sound propagation in straight and variable area ducts with flow, as might be found in a typical turbojet engine duct, muffler, or industrial ventilation system, are reviewed. Both steady state and transient theories are discussed. Emphasis is placed on the advantages and limitations associated with the various numerical techniques. Examples of practical problems are given for which the numerical techniques have been applied.

20B. Crystallography

AD-A088 013/8 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Crystal Physics and Optical Electronics Lab
Crystal Growth by Skull Melting.
Final rept. 1 May 76-30 Apr 79,
A. Linz, D. J. Epstein, and H. P. Jenssen. 24 Jul 80, 10p ARO-14080.1-PX
Contract DAAG29-76-C-0039

Skull Melting and top seeded solution growth of YVO4 were studied. A computerized optical spectroscopy system was designed and implemented. Laser pump laser gain measurements were made of Nd:YAG and CAMGAR. Author)

AD-A088 473/4 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge
Rapid Solidification Processing. An Outlook.
Technical rept. no. 7, Oct 78-Jan 80,
M. Cohen, B. H. Kear, and R. Mehrabian. 11 Aug 80, 25p
Contracts N00014-76-C-0171, N00014-78-C-0387
Prepared in cooperation with United Technologies Research Center, East Hartford, CT. under Contract F33615-76-C-5136 and National Bureau of Standards, Washington, DC under DARPA Order-3751.

The elements of rapid solidification processing (RSP) are highlighted from the standpoints of (a) the fundamentals involved, (b) the prospects for new structure/property relationships, and (c) the interplay between materials processing and the wider field of materials science and engineering. Prototype methods of rapid solidification and consolidation are briefly described. Particular attention is then given to various solidification modes and resulting morphologies as a function of cooling rate from the molten state. These modes span the range of planar, cellular, dendritic, and segregationless (microcrystalline), solidification, the latter being achieved by critical or hypercritical undercooling. The need for careful characterization of RSP microstructures is emphasized, and important scientific challenges for advancing the field of RSP are stressed.

PB80-228950 Not available NTIS
National Bureau of Standards, Washington, DC.
Absorption Correction for Weissenberg Diffractometers.
Final rept.,
A. Santoro, and A. Wlodawer. 1980, 9p
Pub. in Acta Cryst. A36, p442-450 1980.

Formulas are derived extending several semi-empirical absorption-correction methods to diffractometers operating in Weissenberg geometries, with particular attention paid to flat-cone geometry. These formulas are useful for a variety of instruments using both area and linear position-sensitive detectors. While a complete data set can sometimes be corrected using a single absorption reflection, it was found that the best corrections are usually obtained by considering two absorption reflections rather than one. A discussion of the optimum choice of absorption correction when a crystal has at least a twofold symmetry axis is presented. The accuracy of the methods and the limits of applicability have been examined by computer simulations.

PB80-851652 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Czochralski Crystal Growth. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 197p
NERACUSGNT0687
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the theory and applications of the Czochralski crystal growth method in the preparation of silicon crystals, ruby crystals, synthetic corundum crystals, etc. (Contains 158 citations.)

PB80-851660 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Czochralski Crystal Growth. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 168p
NERACEDBNT0687
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the theory and applications of the Czochralski crystal growth method in the preparation of silicon crystals, ruby crystals, synthetic corundum crystals, etc. (Contains 105 citations.)

PB80-851678 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Czochralski Crystal Growth. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 63p NERACEI NT0687
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the theory and applications of the Czochralski crystal growth method in the preparation of silicon crystals, ruby crystals, synthetic corundum crystals, etc. (Contains 050 citations.)

PB80-853781 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Piezoelectric Crystals. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 199p
NERACUSGNT0517
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which cover properties and applications of piezoelectric crystals. Applications include piezoelectric transducers, surface acoustic wave devices and detectors. (Contains 200 citations.)

PB80-854201 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Czochralski Crystal Growth. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 76p
NERACIAANT0687
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the theory and applications of the Czochralski crystal growth method in the preparation of silicon crystals, ruby crystals, synthetic corundum crystals, etc. (Contains 045 citations.)

PB80-854540 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Piezoelectric Crystals. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Lawrence H. Marcus. Jun 80, 109p
NERACIAANT0517
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which deal with properties and applications of piezoelectric crystals. Applications include piezoelectric transducers, surface acoustic wave devices and detectors. (Contains 160 citations.)

PB80-854557 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Piezoelectric Crystals. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 174p NERACEI NT0517
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports which discuss properties, such as dielectric, electric, acoustic, acoustoelectric effects and applications of piezoelectric crystals. Applications include acoustic surface wave devices, filters and piezoelectric transducers. Specific materials, such as polyvinylidene fluoride are also included. (Contains 191 citations.)

PB80-854870 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Synthetic Crystals. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 57p NERACEI NT0671
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the investigations and synthesis of manmade crystals or gems, such as diamonds, quartz, optical crystals, apatites, fluorapatites, proustites and others. Manufacturing and testing of synthetic crystals and gems are also discussed. (Contains 050 citations.)

PB80-856784 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Debye-Waller Factor. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Aug 80, 172p
NERACEDBNT0256
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain discussions of the theory, and application of the Debye-Waller factor. Citations also include the investigation of the Debye-Waller factor for metals utilizing the Moessbauer effect. (Contains 167 citations.)

PB80-856792 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Debye-Waller Factor. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Aug 80, 29p NERACEI NT0256
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain discussions of the theory, and application of the Debye-Waller factor. Citations also include the investigation of the Debye-Waller factor for metals utilizing the Moessbauer effect. (Contains 022 citations.)

20C. Electricity and Magnetism

AD-A088 094/8 PC **A03**/MF **A01**
Naval Underwater Systems Center New London CT New London Lab
Calculation of the Biot-Savart Law Magnetic Field Using Current Distributions Obtained from a Finite Element Analysis.
Technical rept.,
John W. Frye. 27 Jul 80, 31p Rept no. NUSC-TR-6281

Biot-Savart law magnetic field integration equations are derived for rod and plate elements, and for volume interface regions from an equation due to Wikswo. These equations have applications for problems where current distributions are present over extended volumes and are calculated on the basis of a finite element electric field analysis. The Biot-Savart field so calculated can be used in a further finite element analysis of the magnetic field about a body of high permeability located in the same region as the electric field. (Author)

AD-A088 096/3 PC **A05**/MF **A01**
Syracuse Univ NY
Computer Programs for EMC Based on the Methods of Moments.
Phase rept.,
Bradley Strait. Apr 80, 98p RADC-TR-80-93
Contract F30602-78-C-0083

This report describes several user-oriented computer programs based on the method of moments that are available and can be useful in solving problems of electromagnetics and electromagnetic compatibility. Emphasis is placed on applications, relative availability, and limitations of the programs rather than on mathematical details or programming descriptions. Attention is limited to moment-method based computer codes suitable for treatment in the frequency domain and also in the time domain of problems involving the electromagnetic behavior of thin wires and rods, treatment in the frequency domain of problems involving radiation or scattering by two- and three-dimensional conducting and/or penetrable bodies, and frequency domain coupling of electromagnetic energy through apertures in conducting bodies. (Author)

AD-A088 112/8 PC **A04**/MF **A01**
Washington State Univ Pullman Dept of Physics
Measurements of the Effects of Shock Pressure on Two Insulators: AgI and Kapton.
Final rept. 1 Jan 78-30 Jun 80,
G. E. Duvall, and E. R. Lemar. Jul 80, 51p
AFOSR-TR-80-0582
Grant AFOSR-78-3478

The electrical conductivity of AgI has been measured at pressures between 7.79 and 40.9 kbar. Thin disk-shaped samples were prepared by pressing 99.99% pure AgI powder at 4 kbars for three hours. The samples were impacted in a gas gun, and the resistance was measured between electrodes that had been vacuum deposited on the front and rear surfaces of the samples. The data from these experiments are characterized by a rapid decrease in resistance as the shock wave reaches the front electrode, followed by a further decrease as the shock wave travels through the sample and rear electrode into a backing plate of AgI. The resistance reaches a steady value several micro sec after the shock wave has traversed the sample and while the sample is still in a state of steady pressure. The steady value of resistivity decreases with increasing pressure. Resistance of Kapton films .00105 and .00305 inches thick have been measured with the film compressed between two copper plates. Pressures ranged from 40 to 150 kbars. Resistivity decreased in two steps by 10 to 12 orders of magnitude; final resistivity decreases monotonically with increasing pressure. The results are in general agreement with Graham's model of bond scission in polymers, and there is some suggestion of separate contributions by surface and volume effects to the final resistivity. (Author)

AD-A088 114/4 PC **A02**/MF **A01**
Rhode Island Univ Kingston Dept of Mathematics
A Collinear n-Body Problem of Classical Electrodynamics.
Interim rept.,
R. D. Driver, and M. J. Norris. May 80, 10p
AFOSR-TR-80-0586
Contract F49620-79-C-0129
Prepared in cooperation with Sandia National Labs., Albuquerque, NM Contract DE-AC04-76DP00789.

One model for the motion of n charged particles on the x-axis leads to a system of delay differential equations with delays dependent on the unknown trajectories. If appropriate past histories of the trajectories are given, say on alpha, zero, then for sufficiently small equal to or greater than zero one has a system of n squared ordinary differential equations of the form y' = f(t,y) with y(0) = y sub zero are given. The function f, which involves the known past histories of the trajectories, is continuous; so existence of solutions is assured. However, f does not satisfy the Lipschitz condition usually used for proving uniqueness.

AD-A088 230/8 PC **A02**/MF **A01**
Naval Underwater Systems Center New London CT New London Lab
A Functional for Finite Element Analysis of Low Intensity Magnetic Fields Including Permanent Magnetization Effects.
Technical rept.,
John W. Frye. 17 Jun 80, 9p Rept no. NUSC-TR-6289

A functional is presented that is useful in the finite element analysis of low intensity, static magnetic field solutions. The variational principle is written in terms of a scalar potential function and, when minimized, leads to field equations and boundary conditions that characterize a magnetic field--accounting for the presence of current, permanent magnetization, and incident magnetic fields. This variational principle finds applications in the finite element analysis of magnetic field problems. (Author)

PB80-851819 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Lenses. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 83p
NERACIAANT1104
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations discuss the properties and applications of magnetic lenses, for example, in electron spectrometers, in image transformation devices, and as quadrupole lenses. (Contains 063 citations.)

PB80-851827 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Lenses. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 94p
NERACEDBNT1104
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations discuss the properties and applications of magnetic lenses, for example, in electron spectrometers, in image transformation devices, and as quadrupole lenses. (Contains 085 citations.)

PB80-851835 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Lenses. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 78p NERACEI NT1104
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations discuss the properties and applications of magnetic lenses, for example, in electron spectrometers, in image transformation devices, and as quadrupole lenses. (Contains 080 citations.)

PB80-851843 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetostatic Waves. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 93p
NERACIAANT1105
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the physics of magnetostatic waves in plasmas, as surface waves in materials, as principles in measuring devices, etc. (Contains 092 citations.)

PB80-851850 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetostatic Waves. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 102p NERACEI NT1105
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the physics of magnetostatic waves in plasmas, as surface waves in materials, as principles in measuring devices, etc. (Contains 102 citations.)

20D. Fluid Mechanics

AD-A087 982/5 Not available NTIS
Defence Research Establishment Suffield Ralston (Alberta)
Numerical and Experimental Study of a Falling Liquid Column.
G. A. Hill, C. L. Chenier, C. A. Shook, and M. N. Esmail. 2 Apr 79, 9p DRB-REPRINT-4244
Availability: Pub. in Canadian Jnl. of Chemical Engineering, v58 p3-11 Feb 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 060/9 MF **A01**
McDonnell Aircraft Co St Louis MO Design Engineering Power and Fluid Systems Dept
Advanced Fluid System Simulation.
Final rept. 1 Jun 78-31 Jan 80,
H. DeGarcia, R. F. Deshazer, R. J. Levek, Neil J. Pierce, and M. J. Stevens. Apr 80, 770p AFWAL-TR-80-2039
Contract F33615-78-C-2026
Availability: Document partially illegible.

The report describes the continued development and test verification of digital computer models used to simulate hydraulic systems under dynamic conditions. A hydraulic acoustic generator was built and tested for frequency response work. Pulsation attenuation techniques are presented and several modifications were made to the Hydraulic Frequency Response Computer Program (HSFR) including a standing wave plot option. An empirical time domain pump model was developed and additional verification and development of the piston pump transient model was accomplished. Several enhancements were made to the Hydraulic Transient Analysis Computer Program (HYTRAN). A quasi-transient capability was added to the Steady State Flow Analysis Computer Program (SSFAN). The SSFAN Program was updated to extend the calculation capability, add new component models, program features, and reduce the program size. Several programming features were added to the Hydraulic Transient Thermal Analysis Computer Program (HYTTHA) including a temperature default section and environment section. Further verification work was accomplished on the HYTTHA program. (Author)

AD-A088 083/1 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Vortex Shedding from Stationary and Vibrating Bluff Bodies in a Shear Flow.
Memorandum rept.,
Owen M. Griffin. 11 Aug 80, 44p Rept no. NRL-MR-4287

If a fluid is in relative motion past a stationary bluff, or unstreamlined, structure and the vortex shedding frequency approaches one of the natural frequencies of the structure, then resonant flow-induced oscillations of the structure can occur when the damping of the system is sufficiently low. These resonant oscillations are accompanied by a 'lock-on' or capture of the vortex shedding frequency by the vibration frequency over a range of flow speeds, and this lock-on effect causes the wake and the structure to oscillate in unison. The periodic lift and the mean drag forces are amplified as a result of the vibrations, and changes in these fluid forces are closely related to the changes that occur in the flow field in the near wake of the body. Many practical ocean and wind engineering situations involve lightly-damped structures that are located in flows of air or water that are nonuniform along the length of the structure. The primary difference between a uniform flow and a shear flow is the presence and added complexity, in a shear flow, of vorticity whose vector is normal to the plane of the flow. When the incident flow approaches the body this vorticity is turned into the flow direction and interacts with the vortices which are shed from the body into the wake.

AD-A088 175/5 Not available NTIS
Princeton Univ NJ
Long Internal Waves in Fluids of Great Depth,
M. J. Ablowitz, and H. Segur. 23 Dec 78, 14p
Availability: Pub. in Studies in Applied Mathematics, v62 p249-262 1980 (No copies furnished by DTIS/NTIS).

No abstract available.

AD-A088 324/9 PC **A02**/MF **A01**
Aeronautical Research Associates of Princeton Inc NJ
Resonant Interactions of Surface and Internal Gravity Waves.
Technical memo.,
Harvey Segur. 1980, 9p Rept no. ARAP-TM-80-10
Contract N00014-80-C-0048

A stably stratified, two-layer fluid system with a free surface admits resonant triads, including ones involving one surface and two internal waves. Resonant triads that couple surface and internal gravity waves are thought to play an important role in transferring energy from wind-generated surface waves to internal waves. Ball used a geometric construction to show that the linearized dispersion relation for a two-layer liquid system with a free upper surface and no stream velocity admits resonant triads.

AD-A088 529/3 PC **A03**/MF **A01**
California Inst of Tech Pasadena Graduate Aeronautical Labs
Chemical Reactions in Turbulent Mixing.
Interim scientific rept. 15 Apr 79-14 Apr 80,
H. W. Liepmann, G. L. Brown, P. E. Dimotakis, and A. Roshko. 25 Jun 80, 28p GALCIT-151-A, AFOSR-TR-80-0625
Contract F49620-79-C-0159

The combustion facility (H2-F2) is now nearing completion. As of this writing, a high speed mixing layer has been realized in the test section, using high pressure air. This certifies the flow facility down to and including the test section. Preliminary results on the effect of high heat release in a turbulent mixing zone were obtained in the NO-O3 experiment. These results are consistent with predictions based on previously measured p.d.f.'s in non-reacting mixing layers, but in conspicuous disagreements with a variety of accepted model calculations. These results demonstrate again the important influence of the large scale coherent structures on chemical reactions in turbulent flows. The Laser Induced Fluorescence technique has now been extended to allow direct space and time resolved measurements of the reaction products. The first four channels of the multi-channel laser Doppler velocimetry system are essentially completed. The first experiments using this new development are expected in the course of this summer. Digital image analysis of particle streak photography has also been explored as a direct means of two-dimensional measurements of the velocity field in a plane. Finally, a prototype system using a 100 element acoustic detector array has been completed. Initial measurements with four of these channels using 300 kHz sound have been successfully made. (Author)

AEEW-R-1127 PC **A02**/MF **A01**
UKAEA, Winfrith (England). Atomic Energy Establishment.
Principles of X-Ray and Gamma Densitometer Analyses of Transient Two-Phase Flow.
M. H. Burgess. Feb 78, 25p
U.S. Sales Only.

The physical principles of the measurement of the average density of two-phase steam/water mixtures flowing in a pipe, using an X-ray or gamma densitometer, are described. The discussion is confined to vertical pipes where flow stratification can be ignored and the pnase distribution will be a function of radius only. The requirement is to measure the average two-phase density within a section of a pipe and its variation with time so that, with the aid of other flow measurements, the transient mass flow rate can be derived. A single, narrow beam measurement is subject to large uncertainties with annular density distributions. A single wide beam instrument is potentially capable of greater accuracy but will not yield a density distribution as a function of radius. It also suffers from a variable sensitivity across the pipe due to absorption in the steel. Two methods of analysis of results from a three beam instrument are derived and the expected accuracy assessed. With arbitrary radially symmetric void distributions, the analysis errors can be as high as 0.1 g.cm exp -3 but with near homogeneous distributions the accuracy is better than 0.01 g.cm exp -3 . It is therefore recommended that some form of homogeniser should be introduced upstream of the measuring position. (Atomindex citation 10:427276)

FEI-676 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Technique for Measuring of Length of a Tube Wall Zone with Temperature Pulsations in Case of Heat Transfer Crisis.
A. A. Ivashkevich. 1976, 20p
In Russian.
U.S. Sales Only.

A method is proposed and the results of experiments are presented for measurements of the length of the zone of temperature pulsation in the wall of a steam-generating tube in the region of heat transfer crisis. The water has been boiled at a pressure of 138 bar in a tube of diameter 16.2 mm, the heating being effected by means of liquid sodium, the pulsation zone length being 32-170 mm, and the oscillation amplitude of the crisis boundary, 3 - 34 mm. (Atomindex citation 09:408327)

N80-29248/5 PC **A02**/MF **A01**
National Inst. for Aeronautics and Systems Technology, Pretoria (South Africa).
A Basic Computer Program for the Evaluation of the Inviscid Velocity Distribution Along Bodies of Revolution in Axial Flow.
R. A. Streather. Oct 79, 25p CSIR-NIAST-79/116, ISBN-0-7988-1432-1

A rapid method is developed for calculating the velocity distribution along the surface of arbitrary bodies of revolution in inviscid flow. The method is programmed in BASIC for local operation on the Tektronix 4051 computer or for more rapid operation on the CDC Cyber 174 computer. Comparison is made with the exact potential flow solution for an ellipsoid of revolution and with experimental wind tunnel results for an aircraft fuselage.

N80-29250/1 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
The Effect of Throat Contouring on Two-Dimensional Converging-Diverging Nozzles at Static Conditions.
M. L. Mason, L. E. Putnam, and R. J. Re. Aug 80, 70p NASA-TP-1704, L-13591

An experiment was conducted at static conditions to determine the internal performance effects of nozzle throat contouring, the result of increasing the circular-arc throat radius. Five nonaxisymmetric converging-diverging nozzles were tested at nozzle pressure ratios up to 9.0. Data are presented as internal thrust ratios, discharge coefficients, and static-pressure distributions. Comparisons of internal performance data for the five nozzles show that throat contouring increases the value of discharge coefficient but has no significant effect on internal thrust ratio except in cases of internal flow separation. To illustrate the use of the two dimensional converging-diverging (2-D C-D) nozzle data base, a two dimensional inviscid theory was applied to the five configurations. The generally good agreement of data with theoretical results indicates that two-dimensional inviscid theory can be successfully applied to the prediction of 2-D C-D nozzle internal flow.

N80-29251/9 PC **A05**/MF **A01**
Stanitz (John D.), University Heights, OH.
General Design Method for Three-Dimensional Potential Flow Fields. 1: Theory.
Final Report.
J. D. Stanitz. Aug 80, 82p NASA-CR-3288
Contract NAS3-21605

A general design method was developed for steady, three dimensional, potential, incompressible or subsonic-compressible flow. In this design method, the flow field, including the shape of its boundary, was determined for arbitrarily specified, continuous distributions of velocity as a function of arc length along the boundary streamlines. The method applied to the design of both internal and external flow fields, including, in both cases, fields with planar symmetry. The analytic problems associated with stagnation points, closure of bodies in external flow fields, and prediction of turning angles in three dimensional ducts were reviewed.

N80-29622/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Turbulent Structures in Wall-Bounded Shear Flows Observed Via Three-Dimensional Numerical Simulators.
A. Leonard. Jul 80, 30p NASA-TM-81219, A8280
Presented at Turbulence Conf.: The Role of Coherent Structures in Modeling of Turbulence and Mixing, Madrid, 25-27 Jun. 1980.

Three recent simulations of tubulent shear flow bounded by a wall using the Illiac computer are reported. These are: (1) vibrating-ribbon experiments; (2) study of the evolution of a spot-like disturbance in a laminar boundary layer; and (3) investigation of turbulent channel flow. A number of persistent flow structures were observed, including streamwise and vertical vorticity distributions near

the wall, low-speed and high-speed streaks, and local regions of intense vertical velocity. The role of these structures in, for example, the growth or maintenance of turbulence is discussed. The problem of representing the large range of turbulent scales in a computer simulation is also discussed.

N80-29623/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Toward the Use of Similarity Theory in Two-Phase Choked Flows.
R. C. Hendericks, J. V. Sengers, and R. J. Simoneau. 1980, 12p NASA-TM-81568
Proposed for Presentation at Winter Ann. Meeting of the Asme, Chicago 16-21 Nov. 1980.

Comparison of two phase choked flows in normalized coordinates were made between pure components and available data using a reference fluid to compute the thermophysical properties. The results are favorable. Solution of the governing equations for two LNG mixtures show some possible similarities between the normalized choked flows of the two mixtures, but the departures from the pure component loci are significant.

N80-29624/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Preliminary Results from a Four-Working Space, Double-Acting Piston, Stirling Engine Controls Model.
C. J. Daniele, and C. F. Lorenzo. 1980, 17p NASA-TM-81569, DOE/NASA/1040-17
Contract EC-77-A-31-1040
Presented at the 15TH Intersoc. Energy Conversion Eng. Conf., Seattle, 18-22 Aug. 1980.

A four working space, double acting piston, Stirling engine simulation is being developed for controls studies. The development method is to construct two simulations, one for detailed fluid behavior, and a second model with simple fluid behaviour but containing the four working space aspects and engine inertias, validate these models separately, then upgrade the four working space model by incorporating the detailed fluid behaviour model for all four working spaces. The single working space (SWS) model contains the detailed fluid dynamics. It has seven control volumes in which continuity, energy, and pressure loss effects are simulated. Comparison of the SWS model with experimental data shows reasonable agreement in net power versus speed characteristics for various mean pressure levels in the working space. The four working space (FWS) model was built to observe the behaviour of the whole engine. The drive dynamics and vehicle inertia effects are simulated. To reduce calculation time, only three volumes are used in each working space and the gas temperature are fixed (no energy equation). Comparison of the FWS model predicted power with experimental data shows reasonable agreement. Since all four working spaces are simulated, the unique capabilities of the model are exercised to look at working fluid supply transients, short circuit transients, and piston ring leakage effects.

N80-29631/2 PC **A03**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Applied Mathematics.
Nonstationary Filtration in Partially Saturated Porous Media.
C. J. Vanduyn, and L. A. Peletier. May 79, 36p MC-TW-189/79
Submitted for Publication.

From the mathematical formulation of a one dimensional flow through a partially saturated porous medium, a nonlinear free boundary problem is posed, the boundary being between the saturated and the unsaturated regions in the medium. In particular, an equation which is parabolic in the unsaturated part of the domain and elliptic in the saturated part is obtained. Existence, uniqueness, a maximum principle, and regularity properties are proved for weak solutions of a Cauchy-Dirichlet problem in the cylinder (x,t) : 0 or = X or = 1, T or = 0 and the nature, in particular the regularity, of the free boundary is discussed. Finally, it is shown that solutions of a large class of Cauchy-Dirichlet problems converge towards a stationary solution as t tends to infinity. Estimates are given for this rate of convergence.

PB80-221500 Not available NTIS
National Bureau of Standards, Washington, DC.
Generalized OC1 Schemes for Boundary Layer Problems.
Final rept.,
A. E. Berger, J. M. Solomon, M. Ciment, S. H. Leventhal, and B. C. Weinberg. Jul 80, 37p
Sponsored in part by Naval Surface Weapons Center, Silver Spring, MD.
Pub. in Mathematics of Computation 35, n151 p595-731 Jul 80.

A family of tridiagonal formally fourth-order difference schemes is developed for a class of singular perturbation problems. These schemes have no cell Reynolds number limitation and satisfy a discrete maximum principle. Error estimates and numerical results for this family of methods are given, and are compared with those for several other schemes.

PB80-850944 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Coanda Effects. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jun 80, 98p
NERACIAANT0226
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the theory and application of the coanda effect to such topics as volume flow metering, low speed external flow, gas-dynamic noise control, circulation controlled airfoils, etc. A discussion of fluidic control devices is also included. (Contains 133 citations.)

PB80-850951 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Coanda Effects. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 131p
NERACUSGNT0226
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the theory and application of the coanda effect to such topics as volume flow metering, low speed external flow, gas-dynamic noise control, circulation controlled airfoils, etc. A discussion of fluidic control devices is also included. (Contains 118 citations.)

PB80-858285 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rheology. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Aug 80, 225p NERACEI NT0402
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of rheology and rheological methods to such areas as the study of dilute polymer solutions, hydraulic transportation of oil shale, and electrohydrodynamics. Also included is an analysis of some rheological models for generalized fluid flow and mechanics. (Contains 187 citations.)

PB80-858293 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rheology. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Aug 80, 231p
NERACUSGNT0402
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of rheology and rheological methods to such areas as the study of dilute polymer solutions, hydraulic transportation of oil shale, and electrohydrodynamics. Also included is an analysis of some rheological models for generalized fluid flow and mechanics. (Contains 187 citations.)

PB80-858301 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Rheology. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Aug 80, 211p
NERACEDBNT0402
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and application of rheology and rheological methods to such areas as the study of dilute polymer solutions, hydraulic transportation of oil shale, and electrohydrodynamics. Also included is an analysis of some rheological models for generalized fluid flow and mechanics. (Contains 158 citations.)

20E. Masers and Lasers

AD-A087 957/7 PC **A02**/MF **A01**
Air Force Weapons Lab Kirtland AFB NM
An Electronic Transition Chemical Laser.
Final rept.,
William E. McDermott, N. R. Pchelkin, D. J. Bernard, and R. R. Bousek. 3 Jan 78, 5p AFWL-TR-80-502, AD-E200 540
Pub. in Applied Physics Letters, v32 n8 p469-470, 15 Apr 78.

This report covers unclassified laser research performed at the Air Force Weapons Laboratory. The two reports included herein describe the first operation of an oxygen-iodine chemical laser and the first transverse flow high efficiency oxygen-iodine chemical laser.

AD-A087 985/8 PC **A02**/MF **A01**
Stanford Univ CA Dept of Chemistry
Polanyi Memorial Lecture.
Richard N. Zare. 16 May 79, 12p AFOSR-TR-80-0510
Grant AFOSR-77-3363
Pub. in Faraday Discussions of the Chemical Society, n67 p7-15 1979.

No abstract available.

AD-A088 226/6 PC **A09**/MF **A01**
Systems Research Labs Inc Dayton OH Research Applications Div
Advanced Concepts in Closed-Cycle Lasers.
Final technical rept. 6 Dec 76-30 Sep 79,
Robert A. Olson, and Dennis F. Grosjean. Mar 80, 187p AFWAL-TR-80-2026
Contract F33615-76-C-2177

The status of closed-cycle-laser technology is reviewed. The technology and performance of closed-cycle lasers in a recirculating loop and in a novel annular-flow-return configuration are discussed. High-repetition-rate laser operation has been achieved in high-pressure mixtures of Ar:Xe, Ne:Xe, He:Xe, He:Kr, He:Ar, and CO2:CO:Xe:He. New laser lines at 5.13 and 5.44 microns have been observed for the He-Xe laser which generated a maximum average laser output power of 5.1 W at 9.5 kHz. Closed-cycle XeCl laser operation employing a recirculating-loop configuration is discussed. Previously measured laser-seeding-agent photoabsorption cross sections and photoionization yields have been verified. Absolute measurements of UV emission from a CO spark source and measurements of UV emission from a CO2:N2:He capillary discharge have been made. A sliding spark and a dielectric-coupled discharge have been investigated as laser-preionizaton sources. Mercury-halide photolytic excitation studies have been made, and HgBr2 photoabsorption cross sections have been measured. (Author)

N80-29652/8 PC **A12**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Heterodyne Systems and Technology, Part 1.
Aug 80, 266p NASA-CP-2138-PT-1, L-13849

Intern. Conf. Held at Williamsburg, VA., 25-27 Mar. 1980.

No abstract available.

N80-29672/6 PC **A14**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Heterodyne Systems and Technology, Part 2.
Aug 80, 321p NASA-CP-2138-PT-2, L-13849
Conf. Held in Williamsburg, VA., 25-27MAR. 1980.

No abstract available.

N80-29701/3 PC **A07**/MF **A01**
Allgemeine Elektricitaets-Gesellschaft AEG-Telefunken, Frankfurt am Main (Germany, F.R.). Forschungsinst.
Lead Chalcogenide Diode Lasers.
Final Report.
R. Grisar, A. Heime, H. Matthes, H. Preier, and W. Riedel. Dec 79, 136p BMFT-FB-T-79-66, ISSN-0340-7608
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

An infrared diode laser emitting in the spectral range from 4 to 8 microns was developed. An attempt to increase the operational temperature by using double hetero-structures was made. The refining of diode materials, crystal growth (Pb S(1-X) Se(X) and Pb(1-X) Sn(X) Se), and the diode technology of laser structures are reported. The laser casing is described and operating tests are outlined for different cooling techniques. Successful results are shown for continuous wave operation with a liquid nitrogen cooler and for pulsed operation using a Peltier cooler. Finally, laser applications in spectroscopy are discussed.

PATENT-4 205 278
Not available NTIS
Department of Energy, Washington, DC.
Multiple Excitation Regenerative Amplifier Inertial Confinement System.
Patent,
V. E. George, R. A. Haas, W. F. Krupke, and L. G. Schlitt. Filed 11 Jan 78, patented 27 May 80, 22p PAT-APPL-868 639
Supersedes PAT-APPL-868 639-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention relates to apparatus and methods for producing high intensity laser radiation generation which is achieved through an optical amplifier-storage ring design. One or two synchronized, counterpropagating laser pulses are injected into a regenerative amplifier cavity and amplified by gain media which are pumped repetitively by electrical or optical means. The gain media excitation pulses are tailored to efficiently amplify the laser pulses during each transit. After the laser pulses have been amplified to the desired intensity level, they are either switched out of the cavity by some switch means, as for example an electro-optical device, for any well known laser end uses, or a target means may be injected into the regenerative amplifier cavity in such a way as to intercept simultaneously the counterpropagating laser pulses. One such well known end uses to which this invention is intended is for production of high density and temperature plasmas suitable for generating neutrons, ions and x-rays and for studying matter heated by high intensity laser radiation. (ERA citation 05:031069)

PB80-852106 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Laser Irradiation. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 129p NERACEI NT0362
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and applications of laser irradiation to chemical and nuclear reactions, bioengineering, electronics, and physics. (Contains 130 citations.)

PB80-852114 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Laser Irradiation. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 128p
NERACEDBNT0362
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and applications of laser irradiation to chemical and nuclear reactions, bioengineering, electronics, and physics. (Contains 110 citations.)

PB80-852163 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Laser Irradiation. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
William V. Sassi. Jun 80, 133p
NERACIAANT0362
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and applications of laser irradiation to chemical and nuclear reactions, bioengineering, electronics, and physics. (Contains 132 citations.)

PB80-852171 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Laser Irradiation. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Jun 80, 96p
NERACUSGNT0362
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the theory and applications of laser irradiation to chemical and nuclear reactions, bioengineering, electronics, and physics. (Contains 082 citations.)

20F. Optics

AD-A087 999/9 PC **A02**/MF **A01**
Naval Ocean Systems Center San Diego CA
Integrated Optical Logic Gates. A Demonstration of Four Optical Logic Functions.
Independent research rept. Dec 77-Sep 78,
M. J. Taylor, and E. R. Schumacher. 6 May 80, 22p Rept no. NOSC/TR-556

An optical NOT gate has been demonstrated, exhibiting close to 100% modulation and requiring a minimum of 1.2 V for switching between states. An optical AND gate has been demonstrated, using two interferometric intensity modulators in series. A device functioning as either an optical EXCLUSIVE OR gate or an even parity generator has been demonstrated, also exhibiting nearly 100% modulation. Lithium niobate cleaving and polishing techniques were examined, indicating further research is required in this area. (author)

AD-A088 209/2 PC **A02**/MF **A01**
European Office of Aerospace Research and Development FPO New York 09510
European Fiber Optics. USAF Laboratory Experts' Visit.
E. Mason Friar, Armen E. Mardiguian, Randall L. Ray, Edward W. Taylor, and Andrew Yang. Dec 79, 14p Rept no. EOARD-TR-80-11

A team of USAF laboratory experts conducted an assessment of European expertise in fiber optics research, development, and products. Organizations in England, France, Germany and the Netherlands were visited. The team's conclusion is that, while the US holds the advantage in many areas (especially in the development of new components), Europe leads in system implementation and has several unique components and processes of value to the US fiber optics effort. A brief review of each visit is included. (Author)

AD-A088 528/5 PC **A03**/MF **A01**
California Inst of Tech Pasadena
Electromagnetic Propagation in Multimode Optical Fibers, Excited by Sources of Finite Bandwidth.
Final rept. 1 Jul 77-30 Jun 79,
C. H. Papas. 15 Aug 80, 29p ARO-14675.3-EL
Grant DAAG29-77-G-0130

The dependence of the temporal width of the impulse response on the length z of a two-mode optical fiber is examined. This quantity, which is proportional to z in the absence of mode coupling and to z in the presence of weak random coupling among the guided modes, possesses a different dependence in the case of a deterministic resonant-coupling model, appropriate for describing a rather general class of actual situations. The relevant role played by the coherence time of the signal is demonstrated. The effect of strong mode coupling on modal dispersion in optical fibers has been investigated. A coupled system of equations governing the propagation of a signal in a statistical ensemble of multimode optical fibers is presented. The propagation in a multimode optical fiber of a finite bandwidth optical carrier modulated by a nonstationary signal is investigated. The fluctuations of the field due to random modecoupling are considered and the set of coupled equations describing their evolution is derived. In particular, this allows us to investigate the propagation of a frequency-modulated signal and to obtain a general theorem concerning the asymptotic behavior of mode-power fluctuations.

CNRS-CPT-79-P-1098 PC **A02**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Statistical Approach to Light Scattering by Arbitrary Shaped Particles.
P. Chiappetta. Apr 79, 15p
U.S. Sales Only.

A statistical method is described for calculating extinction, absorption and scattering cross-sections for particles of arbitrary shape, whose dimensions are comparable to the wavelength of the incident radiation. The particle is represented by an array of dipoles located on a simple cubic lattice in order to generate arbitrary shapes. The complex vector amplitude of each dipole moment is obtained by a perturbative method. Absorption, extinction and scattering cross-sections are calculated by averaging the cross-sections for a dipole by a classical Gibbs measure taking into account dipole indistinguishability. (Atomindex citation 11:509355)

CNRS-CPT-79-P-1105 PC **A02**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
High Energy Model for Irregular Absorbing Particles.
P. Chiappetta. May 79, 22p
U.S. Sales Only.

In the framework of a high-energy formulation of relativistic quantum scattering a model is presented which describes the scattering functions and polarization of irregular absorbing particles whose dimensions are greater than the incident wavelength. More precisely in the forward direction an amplitude parametrization of eikonal type is defined which generalizes the usual diffraction theory, and in the backward direction a reflective model is used including a shadow function. The model predictions are in good agreement with the scattering measurements off irregular compact and fluffy particles performed by Zerull, Giese and Weiss. (Atomindex citation 11:509356)

PATENT-4 213 670
Not available NTIS
Department of the Navy Washington DC
Planar Fiber Optic Star and Access Coupler.
Patent,
A. Fenner Milton, and Thomas G. Giallorenzi. Filed 6 Oct 77, patented 22 Jul 80, 5p AD-D007 424/5, PAT-APPL-841 859
Supersedes PAT-APPL-841 859-77, AD-D004 518.

Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent is concerned with a planar, optical star and access coupler for multiterminal communication systems which use multimode fibers as the transmission line either as a plurality of single fiber lines, in multichannel fiber cable or in minibundles. The fibers are placed in a row so that the core ends abut the end of a high-aspect angle rectangular cross section clad ribbon fiber which is preferably not as thick as the diameter of the core of the individual fibers for optimum packing fraction loss. Optical radiation, such as from a laser or light-emitting diode, entering the ribbon-fiber mixer element from all of the fibers on one end will be mixed by the ribbon fiber and be transmitted equally on each of the output fibers. Also, radiation from any one fiber will be divided equally between all of the transmission fibers on the opposite end of the ribbon fiber.

PB80-216476 Not available NTIS
National Bureau of Standards, Washington, DC.
Measurement of Propagation Constants Related to Material Properties in High-Bandwidth Optical Fibers.
Final rept.,
D. L. Franzen, and G. W. Day. Dec 79, 6p
Pub. in IEEE Jnl. Quantum Electron. QE-15, n12 p1409-1414 Dec 79.

The material contribution to group index and material dispersion were measured in high-bandwidth graded-index optical fibers. A shuttle-pulse technique provided measurements of group index with precisions and accuracies of 0.1 and 0.2 percent using 5 m lengths of optical fiber. Material dispersion in fibers was measured over the 0.8-0.9 mm wavelength region using different wavelength, short-pulse laser diodes. The influence of material dispersion on fiber bandwidth measurements was evaluated for laser diode sources. Limitations arising from source linewidth, were experimentally determined from measurements on a fiber with high microbending enhanced bandwidth.

PB80-221542 Not available NTIS
National Bureau of Standards, Washington, DC.
Vacuum-Ultraviolet Spectral-Irradiance Calibrations: Method and Applications.
Final rept.,
W. R. Ott, J. M. Bridges, and J. Z. Klose. Jun 80, 3p
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.
Pub. in Optics Letters 5, n6 p225-227 Jun 80.

A method to determine the spectral irradiance of a radiation source in the vacuum ultraviolet through the use of recently developed spectral-radiance standards is described. The method has been applied between 138 and 310 nm, and the spectral irradiances of several different light sources have been measured on an absolute scale with estimated uncertainties less than 10%.

PB80-225212 PC **A03**/MF **A01**
Eikonix Corp., Bedford, MA.
Small Business Innovation Program, Final Report, Phase 1. Selective Thermal Radiators,
Charles R. Hauer. 13 May 80, 38p EC/2411601, NSF/RA-800128
Grant NSF-DAR79-17224

The objective of this work was to determine if a 'prepared surface' could serve to tailor the radiant output of a surface within the thermodynamic limits of blackbody radiation. Experiments used ion implantation to modify the radiation and evaporation surface properties of tungsten filaments operating at about 2800 degrees K. Tungsten filaments ion implanted with carbon at low energy showed an ability to dissipate more energy than unimplanted tungsten filaments when operated in parallel prior to filament failure. Infrared reflectance measurements of a blackbody source indicated anomolous behavior, in that the reflectance and emittance of the surface appeared to be a strong function of the wavelength in the vicinity of the period. There appeared to be a concomitant shift toward longer wavelengths in the peak of the reflected blackbody radiance spectrum when a periodically structured reflector was used. These results were not conclusive of the postulates that either ultra thin filament surface coatings could modify evaporation rate or emissivity, or that a periodically structured surface could suppress long wavelength emittance.

PB80-225428 Not available NTIS
National Bureau of Standards, Washington, DC.
Ellipsometry Data Analysis Aided by Derivative Plots in N, K-Space.
Final rept.,
A. J. Melmed, and J. J. Carroll. 1 Jun 80, 2p
Pub. in Applied Optics 19, n11 p1735-1736, 1 Jun 80.

A technique involving the use of computer generated d Delta/dd, d Psi/dd plots as an aid in the analysis of ellipsometry data is described.

PB80-850357 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Integrated Optics. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jul 80, 167p
NERACIAANT0324
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles in this bibliography include various applications of integrated optical circuits. Design and performance of signal processors, waveguides, etc., using integrated optics, are included. (Contains 165 citations.)

PB80-850365 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Integrated Optics. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jul 80, 170p
NERACUSGNT0324
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles in this bibliography include various applications of integrated optical circuits. Design and performance of signal processors, waveguides, etc., using integrated optics, are included. (Contains 159 citations.)

PB80-850373 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Integrated Optics. April, 1977-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Apr 77-Jun 80,
Howard L. Ogushwitz. Jul 80, 183p NERACEI NT0324
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles in this bibliography include various applications of integrated optical circuits. Design and performance of signal processors, waveguides, etc., using integrated optics, are included. (Contains 200 citations.)

PB80-851900 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Adaptive Optics. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80. 154p
NERACIAANT1016
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the concepts, technology, and systems of adaptive optics. Also considered are applications of adaptive optics to such topics as compression of digitized images, laser pointing and tracking, astronomy, and optical propagation. (Contains 146 citations.)

PB80-851918 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Adaptive Optics. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 96p
NERACUSGNT1016
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the concepts, technology, and systems of adaptive optics. Also considered are applications of adaptive optics to such topics as compression of digitized images, laser pointing and tracking, astronomy, and optical propagation. (Contains 077 citations.)

PB80-853773 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photoluminescence. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 172p
NERACEDBNT0559
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains citations dealing with the photoluminescent properties and spectra of laser, semiconductor, scintillator, and solar energy absorbtion materials. Crystal defect detection, crystal photoluminescent spectra, and temperature effects on photoluminescent spectra are included. (Contains 180 citations.)

PB80-854136 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photoluminescence. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 166p
NERACUSGNT0559
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains citations which deal with the photoluminescent properties and spectra of laser, semiconductor, scintillator, and solar energy absorption materials. Crystal defect detection, crystal photoluminescent spectra and temperature effects on photoluminescent spectra are included. (Contains 166 citations.)

PB80-854144 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photoluminescence. May, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for May 74-May 80,
Lawrence H. Marcus. Jun 80, 115p
NERACIAANT0559
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains citations which deal with the photoluminescent properties and spectra of laser, semiconductor, scintillator, and solar energy absorption materials. Crystal defect detection, crystal photoluminescent spectra, and temperature effects on photoluminescent spectra are included. (Contains 160 citations.)

PB80-854151 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photoluminescence. December, 1977-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Dec 77-Jun 80,
Lawrence H. Marcus. Jun 80, 197p NERACEI NT0559
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains citations which deal with the photoluminescent properties and spectra of laser, semiconductor, scintillator, and solar energy absorption materials. Crystal defect detection, crystal photoluminescent spectra, and temperature effects on photoluminescent spectra are included. (Contains 197 citations.)

PB80-855083 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Polarizing Glass. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jul 80, 48p NERACIAANT0737
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from world wide sources are cited concerning the characteristics, performance, and applications of linear, dielectric, and light wave polarization. Citations on refractivity, optical anisotropy, and spectral sensitivity are included for applications such as laser technology, antireflection coatings, and glass fibers. (Contains 040 citations.)

PB80-855091 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Polarizing Glass. June, 1970- , 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70- Ju 80,
Walter Van Put. Jul 80, 53p NERACUSGNT0737
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from world wide sources are cited concerning the characteristics, performance, and applications of linear, dielectric, and light wave polarization. Citations on refractivity, optical anisotropy, and spectral sensitivity are included for applications such as laser technology, antireflection coatings, and glass fibers. (Contains 038 citations.)

PB80-857501 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Optical Coatings. August, 1977-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Aug 77-Jun 80,
Lawrence H. Marcus. Jun 80, 117p NERACEI NT0513
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which deal with methods of application, properties, and evaluation of optical coatings. The use of reflective and antireflective coatings in laser windows and mirrors, thermal solar collectors, visible light apparatus, thermal control of spacecraft, and solar cells is covered. The use of selective coatings in solar energy collectors, optical, infrared, and X-ray instruments, electroconductive and dielectric coatings for lasers and solar cells, is included. Application techniques, both laboratory and industrial processes, are described and evaluated. (Contains 193 citations.)

PB80-857519 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Optical Coatings. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Lawrence H. Marcus. Jun 80, 98p
NERACIAANT0513
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which deal with methods of application, properties, and evaluation of optical coatings. The use of reflective and antireflective coatings in laser windows and mirrors, thermal solar collectors, visible light apparatus, thermal control of spacecraft, and solar cells is covered. The use of selective coatings in solar energy collectors, optical, infrared, and X-ray instruments, electroconductive and dielectric coatings for lasers and solar cells, is included. Application techniques, both laboratory and industrial processes, are described and evaluated. (Contains 130 citations.)

PB80-857527 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Optical Coatings. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 169p
NERACEDBNT0513
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which deal with methods of application, properties, and evaluation of optical coatings. The use of reflective and antireflective coatings in laser windows and mirrors, thermal solar collectors, visible light apparatus, thermal control of spacecraft, and solar cells is covered. The use of selective coatings in solar energy collectors, optical, infrared, and X-ray instruments, electroconductive and dielectric coatings for lasers and solar cells, is included. Application techniques, both laboratory and industrial processes, are described and evaluated. (Contains 165 citations.)

PB80-857535 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Optical Coatings. June, 1974-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 74-Jun 80,
Lawrence H. Marcus. Jun 80, 206p
NERACUSGNT0513
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports are cited which deal with methods of application, properties, and evaluation of optical coatings. The use of reflective and antireflective coatings in laser windows and mirrors, thermal solar collectors, visible light apparatus, thermal control of spacecraft, and solar cells is covered. The use of selective coatings in solar energy collectors, optical, infrared, and X-ray instruments, electroconductive and dielectric coatings for lasers and solar cells, is included. Application techniques, both laboratory and industrial processes, are described and evaluated. (Contains 191 citations.)

20G. Particle Accelerators

BNL-27975 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Lectures in Accelerator Theory.
M. Month. 1980, 53p
Contract AC02-76CH00016

Lecture I deals with the behavior of particles in the nonlinear field arising from the electromagnetic interaction of colliding beams. The case treated, that of counter-rotating proton beams crossing each other at a non-zero angle, has the simple feature that the force between the beam is one dimensional. In lecture II, an analysis of the development of traveling waves on particle beams is presented. The situation studied is that of a uniform beam current in a circular accelerator and the excitation for the coherent motion is induced by the resistivity of the vacuum chamber wall. Finally, in lecture III, a description of the current accumulation process used at the proton storage rings at CERN (The ISR) is given. Particle pulses of rather low average current are injected and stored along the length and width of the vacuum chamber. The efficiency is very high and large currents (over 40 amperes) have been achieved. (ERA citation 05:029542)

BNL-28019 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Proton-Proton Colliding Beam Facility ISABELLE.
H. Hahn. 1980, 12p CONF-800740-1
Contract AC02-76CH00016
11. international conference on high energy accelerators, Geneva, Switzerland, 7 Jul 1980.

This paper attempts to present the status of the ISABELLE construction project, which has the objective of building a 400 + 400 GeV proton colliding beam facility. The major technical features of the superconducting accelerators with their projected performance are described. Progress made so far, difficulties encountered, and the program until completion in 1986 is briefly reviewed. (ERA citation 05:029543)

CEA-CONF-4462 PC **A02**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Production of a Continuous Neutron Spectrum Via the Reaction exp 9 Be(D,N) exp 10 B Using the Tandem Van de Graaff Accelerator at the Bruyeres-le-Chatel Nuclear Studies Center.
S. Plattard, M. Dumazert, D. Gimat, L. Sinopoli, and J. L. Uzureau. 1978, 5p
In French.
U.S. Sales Only.

A time-of-flight facility has been set up at the Centre d'Etudes de Bruyeres-le-Chatel using the super EN tandem Van de Graaff as a pulsed neutron source via the reaction exp 9 Be(d,n) exp 10 B on a thick target. After a description of the neutron production, the authors compare the white neutron spectrum with the one obtained from a similar facility at LASL and those delivered by ORELA (Oak Ridge) and WNR (Los Alamos). A description of the setup used for the exp 232 Th (n,f) experiment in progress is also presented where an energy resolution delta E(keV) = 2.9 (E(MeV))sup(3/2) has been achieved. (Atomindex citation 11:497129)

CERN-79-07 PC **A05**/MF **A01**
European Organization for Nuclear Research, Geneva (Switzerland).
Particle Accelerators and Scientific Culture.
U. Amaldi. 14 Aug 79, 92p
In French.
U.S. Sales Only.

A historical review of fifty years of physics around particle accelerators, from the first nuclear reactions produced by beams of artificially accelerated particles to the large multinational projects now under discussion. The aim is to show how our description of natural phenomena has been shaped by advances in theoretical understanding, the development of new techniques, and the characters of men. Large use has been made of quotations from many of the scientists involved. (Atomindex citation 11:508652)

CERN-79-09 PC **A03**/MF **A01**
European Organization for Nuclear Research, Geneva (Switzerland).
Radioecological Considerations for Operating Particle Accelerators.
K. Goebel. 18 Sep 79, 33p
U.S. Sales Only.

Arguments are given to show that standard regulations concerning nuclear installations should not be applied without discrimination to particle accelerators, where it is possible to exclude a priori most of the paths for radiation exposure of persons outside the installation. In particular, the proper design of cooling circuits and ventilation systems will exclude, under normal operating conditions, radioactivity in water outside the installation and internal exposure from nuclides released in air. In considering the external risks from gaseous nuclides, accelerator installations can be divided into two groups: those with radioecological relevance and those that cannot cause significant exposure of persons working or living in the vicinity. Available beam power (depending on the primary-beam energy), and the amount of neutron production, are shown to be suitable parameters to distinguish between the two groups. The former ranges from 20 kW for 10-50 MeV electrons down to 50 W for ion accelerators of > 150 MeV/nucleon; the latter is 10 exp 14 neutrons/s. In support of these conclusions, relevant measurements at a number of installations are summarized in appendices. (Atomindex citation 11:508368)

GSI-79-7 PC **A03**/MF **A01**
Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.).
Layout of a High-Intensity LINAC for Very Heavy Ions with R.F. Quadrupole Focusing.
R. W. Mueller. May 79, 33p
U.S. Sales Only.

For the initial acceleration of very heavy ion beams of highest instantaneous intensity a new type of linear accelerator is proposed which will accelerate exp 238 U exp 1+ or exp 238 U exp 2+ ions and uses the principle of r.f. quadrupole focusing. (Atomindex citation 11:497117)

HU-P-145 PC **A03**/MF **A01**
Helsinki Univ. (Finland). Dept. of Nuclear Physics.
Efficient Estimation of High-Energy Beam Track Parameters from Correlated Electronical Measurements.
P. Laurikainen. 8 Feb 78, 34p
U.S. Sales Only.

It is shown that the neglection of the correlations between measurements can lead to a significant loss of information in the estimation of high-energy beam track parameters from electronic data. Correlations arise typically from the small-angle multiple scattering. A method is presented which also takes into account the correlation information, obtained from multiple scattering theory, and it is compared with the common least square methods, using as test case a simulation model of a real-life beam-defining system. It is also shown how the computer simulation can help to design a system, which extracts maximum information on track parameters, with the given hardware. This system optimization is based on a statistical information measure. (Atomindex citation 11:497109)

Interiko-79/2 PC **A02**/MF **A01**
Instituut voor Kernphysisch Onderzoek, Amsterdam (Netherlands).
Report on the Charlotteaville Conference on "Future Possibilities for Electron Accelerators". Implications for the Future of IKO.
O. de Vries, and P. J. T. Bruinsma. Apr 79, 22p
U.S. Sales Only.

After a presentation of the electron accelerator projects discussed at the Charlottesville Conference on "Future possibilities for electron accelerators", conclusions are drawn how IKO should proceed to maintain its lead in electron beam specifications for intermediate energy physics in the next 10-20 years. The most favourable approach at this moment seems to be: Install a storage-slow bleeding device in the present accelerator vault to be filled with short pulses (5-10 mu s) obtained from MEA. In this way the beam duty factor and energy can be upgraded to >50%, respectively up to 1000 MeV (depending on costs). (Atomindex citation 11:497155)

IFVE-OUNK-78-175 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Carbon Foil Using for Generation Secondary Particle BEAMS on Proton Synchrotrons.
L. L. Nemenov, Yu. A. Plis, V. M. Plotko, N. M. Tarakanov, and V. N. Chepegin. 1978, 8p
In Russian.
U.S. Sales Only.

The possibility of the work with the microne carbon foils at pulse heating and mechanical loads, arising at the interposition of foils in the beam, is investigated for the generation beams of ultrarelativistic positronium on the IHEP synchrotron. The foil thickness is determined according to the value of energetic losses of alpha -particles from exp 241 Am source. The carbon foils about 200 mu g/cm exp 2 thick were interposed into the chamber of the IHEP 70 GeV proton synchrotron with the help of a standard internal target mechanism. It is shown that foil target application with 10-20% efficiency leads to insignificant change of the internal beam parameters, the secondary particle beam structure is considerably improved. The duration of foil continuous operation at 5x10 exp 11 proton/pulse is more than 100 hours. (Atomindex citation 11:497123)

INIS-mf-5350 PC **A05**/MF **A01**
Instituut voor Kernphysisch Onderzoek, Amsterdam (Netherlands).
IKO. Annual Report 1977.
1978, 93p
U.S. Sales Only.

Experimental work with the old cyclotron was terminated in April 1977, and the new accelerator MEA put into operation. During 1977 the chemistry low energy hall and the electron scattering low energy hall became operational. Much progress was made with the design and construction of the beam handling system and spectrometers for the high energy electron hall. The instrumentation and facilities in the electron scattering areas, the pion muon area, the 100 MeV chemistry area and for the accelerator MEA and technical services are described. Research into electron scattering experiments, pion and muon physics, nuclear theory, nuclear spectroscopy, radio- and nuclear chemistry and nuclear reactions is reported. (Atomindex citation 11:497553)

INIS-mf-5351 PC **A06**/MF **A01**
Instituut voor Kernphysisch Onderzoek, Amsterdam (Netherlands).
IKO. Annual Report 1978.
1979, 102p
U.S. Sales Only.

During 1978 work has proceeded on the new accelerator, the energy of the beam in the low energy hall being increased to 85 MeV. Four beam periods can be used for testing instrumentation and eleven of the twelve accelerator stations have their accelerator sections and modulator cases installed, though only three of them have their lines mounted. All of the magnets of the beam conducting and treatment system to the high energy electron scattering hall have been placed. Research in electron scattering, pion and muon physics, nuclear theory and radio- and nuclear chemistry is reported. Facilities and instrumentation are detailed and progress in the operation of MEA and the experimental facilities described. (Atomindex citation 11:497554)

JAERI-M-8142 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Cable Systems for Experimental Facilities in JAERI TANDEM ACCELERATOR BUILDING.
Y. Tukihashi, T. Yoshida, and E. Takekoshi. Mar 79, 41p
In Japanese.
U.S. Sales Only.

Measuring cable systems for experimental facilities in JAERI TANDEM ACCELERATOR BUILDING were completed recently. Measures are taken to prevent penetration of noises into the measuring systems. The cable systems are described in detail, including power supplies and grounding for the measuring systems. (Atomindex citation 11:497150)

JINR-R-1-12163 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Difference Method for Measuring a Mean Particle Energy in Collimated BEAMS by Means of Vavilov-Cherenkov Radiation.
V. P. Zrelov. 1979, 8p
In Russian.
U.S. Sales Only.

The difference method of measuring the average energy of relativistic collimated particles by means of Vavilov-Cherenkov radiation arising when particles pass through two plane-parallel radiators being in the optical contact is described. The calculation formulas for determining the average particle energy and the measurement errors are given. An example of calculating the dependence of the errors of particle velocity upon the measurement errors of the angle difference is presented. The attainable accuracy of the method, e.g., for protons with beta =0.875 can be about 1.2 meV. (Atomindex citation 11:497161)

JINR-R-16-12078 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of Radiation Safety.
Study of the Fluence and Neutron Dose Energy Distribution at Large Distances from Accelerators.
M. M. Komochkov, A. L. Shishkin, B. V. Man'ko, and B. S. Sychev. 1979, 11p
In Russian.
U.S. Sales Only.

The transport to large distances of neutrons produced by high-energy accelerators is studied experimentally and theoretically for the Dubna synchrocyclotron. This accelerator uses superposition of the point monodirectional and point isotopic sources with neutron spectra on a synchrocyclotron shielding. Comparison of calculated and experimental data provides for the possibility to estimate the source anisotropy and energy distribution of the fluence, and the population dose of neutrons (especially for the energy of neutrons above 20 MeV) at large distances from an accelerator. It is shown that the calculation of this dose dependence on a distance by any empirical relations could cause significant errors in estimating individual doses. (Atomindex citation 11:508413)

JINR-R-9-12335 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods.
Focusing of an Electron Ring During the Compression Inside a Narrow Metal Chamber.
Yu. I. Aleksakhin, and E. A. Perel'shtein. 1979, 19p
In Russian.
U.S. Sales Only.

Considered is the effect of shielding of electron ring self-fields with chamber conducting walls close to it, on the ring electron coherent and incoherent motion. It is shown that for ultrarelativistic electron energies the intensity limitation, imposed by the requirement of ring stability as a whole in the chamber mid-plane, is the most stringent. The more is the shift between the chamber and external magnetic field mid-planes, the less is acceptable number of electrons in the ring. A method of passive stabilizing the ring axial coherent motion with the system of opposing coils is proposed. The coils compensate partially electrostatic ring attraction to chamber walls and diminish tha asymmetry of external magnetic field. It is demonstrated that such a system permits an increase in the number of electrons compressed ring. (Atomindex citation 11:508646)

JINR-10-12273 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Multichannel Ionization System for Monitoring Accelerated BEAMS of Light Nuclei.
V. I. Volkov, I. F. Kolpakov, I. I. Kulikov, and V. M. Slepnev. 1979, 8p
In Russian.
U.S. Sales Only.

A multichannel system for monitoring beams of accelerated nuclei at the Dubna synchrophasotron is described. An ionization monitor placed in a vacuum chamber of the accelerator is used for beam detection. The electronic hardware is a part of a CAMAC branch interfaced to an ES-1010 computer through a system crate. The intensity curve and radial density distribution of a beam of accelerated particles are presented on a graphic display screen. (Atomindex citation 11:497154)

JINR-16-12375 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Experimental Investigations of Construction Material Activation in the 680 MeV Synchrocyclotron Hall.
V. F. Kas'yanov, M. M. Komochkov, and Yu. G. Teterev. 1979, 10p
In Russian.
U.S. Sales Only.

The activation due to scattered neutrons of the 680 MeV synchrocyclotron by means of Ge semiconductor detector was investigated. The activation of shielding materials widely used presently (ground, concretes) and that of those which seem perspective because of their low activation (marble, borated concretes) was investigated. Activities of isotopes produced in samples under investigation are tabulated. Shielding materials are arranged according to increasing specific induced radioactivity: marble, standard concrete ground, hematite concrete. (Atomindex citation 11:508372)

JINR-9-12124 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Induction Accelerating System of the Electron-Ring Accelerator Prototype.
V. P. Sarantsev, L. N. Belyaev, G. V. Dolbilov, V. I. Kazacha, and I. V. Kozhukhov. 1979, 9p
In Russian.
U.S. Sales Only.

Induction accelerating system similar to linear induction accelerators is considered as applied to the acceleration of electron rings. The system con-

sists of a solenoid for preliminary acceleration, a system of pulsed power supply, an induction accelerating section and modulators. The leading magnetic field with inhomogeneity danti Hsub(z)/dz<50 Oe/cm on a level of 10000 Oe is formed over the whole length of the accelerating section. The intensity of the vertex electric field on the whole section of acceleration is equal to 5 kV/cm with duration 200 ns. The transporation of the ring at a distance of 3m from the adgezator median plane has been performed and the ring size of approximately 3 mm has been obtained. (Atomindex citation 11:497130)

JINR-9-12361 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Measurement of Ion Source Beam Emittance on-Line with the ES-1010 Computer.
V. N. Anosov, V. A. Bogach, V. I. Danilov, and E. I. Rozanov. 1979, 12p
In Russian.
U.S. Sales Only.

Considered is a device mounted in the ionoconductor of the model of the phasotron axial injector. To measure beam dimensions, two grids are used which consist of wires stretched in parallel and mounted along the beam motion one after another. The first grid is introduced into the beam crossover. Data readout from grids goes via the peripheral unit of the ES-1010 computer for 1, 2 s. It decreases the influence of instability of the ion source regime on measurement results. Beam dimensions are determined by a computer on the first and the second grids, and the emittance is calculated under assumption that the beam phase representation is a direct ellipse. The emittance determination takes about 30 s, calculations and printing of results being included. The measurement of beam dimensions by means of grids connected on-line with the computer decreases the time needed for measurements. (Atomindex citation 11:508666)

KFK-2835 PC **A06**/MF **A01**
Heidelberg Univ. (Germany, F.R.). Naturwissenschaftliche Gesamtfakultaet.
Computer Controlled Beam Diagnostics and Beam Optimization at the Karlsruhe Isochronous Cyclotron.
W. Kneis. Jul 79, 116p
In German. Thesis.
U.S. Sales Only.

The computer-controlled diagnostic- and monitoring-system at the Karlsruhe Isochronous Cyclotron is described and discussed. The main emphasis is on the automatic beam optimization. For the external beam guiding system of the Karlsruhe Isochronous Cyclotron two independent procedures for the automatic beam optimization were developed. As basis for these procedures the theoretical knowledge from beam transport calculations and the methods of mathematical parameter optimization with many variables were used. It is very easy to apply both procedures to other external beam guiding systems. The methods of parameter optimization used are formulated in a way not specific to the problem, so that they can be applied also to other problems like optimization of the extraction. The automatic optimization of the external beam can be performed either by using beam transport calculations (theoretical optimization) or by using the particle beam itself (experimental optimization). (Atomindex citation 11:508777)

KFK-2864 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik.
Digital Control Unit for the Eigenfrequency Tuner of the Linac R.F. Control System.
A. Hornung, and P. Schlick. Sep 79, 29p
In German.
U.S. Sales Only.

Progress in the development of the digital unit of the eigenfrequency tuner being part of the R.F. control system of the LINAC is reported. The improvements concern the principle of the digital circuit as well as technical details. As a result, significant reduction of the hardware size and better reliability is obtained. In total 9 units have been operated in several long-term accelerator runs without any fault. (Atomindex citation 11:508756)

LBL-11007 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Progress on the Superconducting Magnet for the Time Projection Chamber Experiment (TPC) At PEP.
M. A. Green, P. H. Eberhard, and W. A. Burns. 1980, 24p CONF-800684-1
Contract W-7405-ENG-48
International conference on experimentation at LEP, Uppsala, Sweden, 16 Jun 1980.

The TPC (Time Projection Chamber) experiment at PEP will have a two meter inside diameter superconducting magnet which creatests a 1.5 T uniform solenoidal field for the TPC. The superconducting magnet coil, cryostat, cooling system, and the TPC gas pressure vessel (which operatests at 11 atm) were designed to be about two thirds of a radiation length thick. As a result, a high current density coil design was chosen. The magnet is cooled by forced flow two phase helium. The TPC magnet is the largest adiabatically stable superconducting magnet built to date. The paper presents the parameters of the TPC thin solenoid and its subsystems. Tests results from the Spring 1980 cryogenic tes are presented. The topics to be dealt with in the paper are cryogenic services and the tests of magnet subsystems such as the folded current leads. Large thin superconducting magnet technology will be important to large detectors to be used on LEP. (ERA citation 05:029530)

LBL-9961 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
New Sources of Radiation.
W. Schimmerling. Sep 79, 42p
Contract W-7405-ENG-48

An attempt is made to select examples of radiation sources whose application may make new or unconventional demands on radiation protection and dosimetry. A substantial body of knowledge about high energy facilities exists and, partly for this reason, the great high energy accelerators are mentioned only briefly. (ERA citation 05:029529)

NIRS-M-26 PC **A02**/MF **A01**
National Inst. of Radiological Sciences, Chiba (Japan).
NIRS-Chiba Isochronous Cyclotron 1978.
Mar 79, 16p
U.S. Sales Only.

In the period from January to December 1978, the NIRS-Chiba isochronous cyclotron has been used regularly for medical and biological purposes, i.e. clinical trial of fast neutron therapy, radiobiology and production of short-lived radioactive nuclides. Reporting the activities during the period, the following are given: features of the year, machine research and improvement, partition of machine time, radiation doses received by personnel, principal particulars of cyclotron, personnel, and publications. (Atomindex citation 11:497120)

N80-29597/5 PC **A03**/MF **A01**
Technische Universitaet, Munich (Germany, F.R.). Lehrstuhl fuer Raumfahrttechnik.
Development of an Electromagnetic Pellet-Accelerator.
E. Igenbergs, H. Kuczera, and P. Lell. Mar 79, 50p TUM-RT-TB-79/1
Contract F-E-10-284

A simple electromagnetic accelerator was developed and tested. The primary and secondary circuits (the driver) were investigated analytically and experimentally. Optimum values and configuration for the primary and secondary coils were derived in a model. Experiments were conducted to verify these values. A qualitative agreement is obtained, but the experiments reveal that some disregarded mechanisms in the model lead to lower velocities or higher diameters of the driver. Many photographs were taken of the accelerated drivers and projectiles. Different methods for the measurement of the velocity were applied and tested. A special Doppler-radar method was used. This method is shown suitable for the continuous measurement of the velocity of projectiles in the 1 mm diameter range and having velocities up to 1 km/sec. It is suggested that this electromagnetic accelerator could be used as an injector for deuterium pellets.

PATENT-4 197 510 Not available NTIS
Department of the Navy Washington DC
Isochronous Cyclotron.
Patent,
Harold H. Szu. Filed 23 Jun 78, patented 8 Apr 80, 8p AD-D007 434/4, PAT-APPL-916 241
Supersedes PAT-APPL-918 241-78, AD-D005 426.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A solenoid comprising several, discrete, coaxial, circular, superconducting coils provides a magnetic field which decreases radially to an absolute minimum intensity to focus the ions as they are accelerated to the end of the non-relativistic velocity range. As the ions are further accelerated to relativistic velocities, the magnetic field increases radially from the absolute minimum intensity to compensate for the relativistic increase in mass. The revolving ions are accelerated by repeated passage through an electric field which is established in radially-directed resonator horns. The accelerating structure and the associated electric field reinforce the focusing provided by the radially-increasing magnetic field. (Author)

PATENT-4 215 291 Not available NTIS
Department of the Navy Washington DC
Collective Particle Accelerator.
Patent,
Moshe Friedman. Filed 2 Feb 79, patented 29 Jul 80, 8p AD-D007 423/7, PAT-APPL-6-008 820
Supersedes PAT-APPL-008 820-79, AD-D005 971.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent concerns a collective particle accelerator including an intense relativistic electron beam (IREB) generator, an automodulation section, an acceleration region and injection region. A negative high voltage is applied to a ring cathode which produces an IREB. The IREB propagates through the accelerator. On propagating through the automodulation section, the electrons are modulated thereby forming them into ring-shaped bunches. The acceleration section is surrounded by a longitudinal uniform magnetic field along its length and is provided with special magnetic field means which changes the uniform magnetic field to a rippled magnetic field. The rippled magnetic field causes the bunches of electrons to contract and expand radially as they propagate through the rippled magnetic field which in turn causes ions or electrons injected into the system to be accelerated by attraction or repulsion as the electron rings contract and expand radially.

PB80-218464 Not available NTIS
National Bureau of Standards, Washington, DC.
Recirculating Accelerators with Room Temperature RF.
Final rept.,
S. Penner. 1979, 22p
Pub. in Proceedings of the Conference on Future Possibilities for Electron Accelerators, Charlottesville, VA., Jan 8-10, 1979, pG-1--G-22 1979.

This paper discusses the need for cw accelerators for nuclear research, the problems in developing such accelerators, and the NBS/LASL proposal for research aimed at developing recirculating electron accelerators using room temperature rf accelerating techniques.

PUB-300(V.5)(No.1) PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Research/Accelerators. Bimonthly Status Report of Operations, January-February 1980.
J. W. Knight. 1980, 50p
Contract W-7405-ENG-48

Operations during January and February 1980 are summarized. Topics covered include publications and presentations; accelerator operations; and a research program summary for the Bevatron/Bevalac, 88-inch cyclotron, and 184-inch cyclotron. Progress on the PEP storage rings is described, and news is given of the Bevalac user's meeting, the Nuclear Science Program Advisory Committee

meeting proposal deadline, and the new HILAC distribution magnet. (ERA citation 05:031083)

SAND-80-0456C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Low Jitter Spark GAP Switch for Repetitively Pulsed Parallel Capacitor Banks.
G. J. Rohwein. 1980, 8p CONF-800640-2
Contract AC04-76DP00789
14. pulse power modulator symposium, Orlando, FL, USA, 3 Jun 1980.

A two-section air insulated spark gap has been developed for switching multi-kilojcule plus-minus charged parallel capacitor banks which operate continuously at pulse rates up to 20 pps. The switch operates with less than 2 ns jitter, recovers its dielectric strength within 2 to 5 ms and has not shown degraded performance in sequential test runs totaling over a million shots. Its estimated life with copper electrodes is > 10 exp 7 shots. All preliminary tests indicate that the switch is suitable for continuous running multi-kilojoule systems operating to at least 20 pps. (ERA citation 05:029532)

SAND-80-0460C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Measurement of Fast Risetime Megampere Currents by Quartz Gauge.
R. R. Williams, D. H. McDaniel, and R. W. Stinnett. 1980, 4p CONF-800640-6
Contract AC04-76DP00789
14. pulse power modulator symposium, Orlando, FL, USA, 3 Jun 1980.

Quartz gauges have been used on the Sandia National Laboratories Proto II accelerator to measure current in the magnetically insulated transmission line at the 11 TW power level. The accelerator delivers 3.5 MA at 2 x 10 exp 14 A/s in a 40 ns pulse to a 0.0127 m diameter aluminum liner to produce a high density plasma. At this radius and dI/dt levels, the B-dot monitors no longer function for the measurement of load current because the monitor suffers electrical breakdown. Quartz pressure gauges mounted at a radius of 0.0086 m have successfully measured the magnetic pressure due to the load current with nanosecond temporal resolution. (ERA citation 05:029533)

SAND-80-1241C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Simulation of Power Flow in Magnetically Insulated Convolutes for Pulsed Modular Accelerators.
D. B. Seidel, B. C. Goplen, and J. P. VanDevender. 1980, 16p CONF-800640-9
Contract AC04-76DP00789
14. pulse power modulator symposium, Orlando, FL, USA, 3 Jun 1980.

Two distinct simulation approaches for magnetic insulation are developed which can be used to address the question of nonsimultaneity. First, a two-dimensional model for a two-module system is simulated using a fully electromagnetic, two-dimensional, time-dependent particle code. Next, a nonlinear equivalent circuit approach is used to compare with the direct simulation for the two module case. The latter approach is then extended to a more interesting three-dimensional geometry with several MITL modules. (ERA citation 05:029535)

SGAE-2994 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Radiation Field of the 500 KeV-Electron Accelerator of the Research Center Seibersdorf.
P. Gehringer, H. Eschweiler, and E. Proksch. Oct 78, 13p CH-241/78
In German.
U.S. Sales Only.

The dose for irradiations, performed with an electron accelerator, is influenced by a lot of different factors. For the 500 keV-irradiation facility of the Department of Chemistry at the Research Center Seibersdorf these factors have been determined and in this way the radiation field of this accelerator characterized exactly. . (Atomindex citation 11:508366)

UCRL-83912 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
FXR One-Nanosecond-Jitter Switch.
H. B. McFarlane, and R. Kihara. 1980, 4p CONF-800640-15
Contract W-7405-ENG-48
14. pulse power modulator symposium, Orlando, FL, USA, 3 Jun 1980.

A switching system using low-jitter spark gaps has been designed for a 20 MeV Flash X-Ray (FXR) linear induction accelerator that is being built at the Lawrence Livermore National Laboratory. The accelerator, which is now under construction, will consist of 54 modules connected in tandem. Each module will contribute up to 400 keV of energy to the electron beam traversing it. The experimental work included a test of one accelerator module designed to produce 400 keV. Of particular concern was the thorough characterization of the Blumlein switch in terms of lifetime, voltage hold off and operating pressure range to produce minimal jitter and an acceptably low prefire rate. The data was recorded by means of a computer-based data-acquisition system which was set up for later, automatic data reduction and display fo the results. Optimization of the spark gap operating parameters resulted in a firing jitter of less than one nanosecond rms. (ERA citation 05:029537)

UCRL-83970 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore National Lab, CA.
Computer Models in the Design of FXR.
G. Vogtlin, and R. Kuenning. 1980, 16p CONF-800640-14
Contract W-7405-ENG-48
14. pulse power modulator symposium, Orlando, FL, USA, 3 Jun 1980.

Lawrence Livermore National Laboratory is developing a 15 to 20 MeV electron accelerator with a beam current goal of 4 kA. This accelerator will be used for flash radiography and has a requirement of high reliability. Components being developed include spark gaps, Marx generators, water Blumleins and oil insulation systems. A SCEPTRE model was developed that takes into consideration the non-linearity of the ferrite and the time dependency of the emission from a field emitter cathode. This model was used to predict an optimum charge time to obtain maximum magnetic flux change from the ferrite. This model and its application will be discussed. JASON was used extensively to determine optimum locations and shapes of supports and insulators. It was also used to determine stress within bubbles adjacent to walls in oil. Computer results will be shown and bubble breakdown will be related to bubble size. (ERA citation 05:029538)

UTTAC-J-1 PC **A04**/MF **A01**
Tsukuba Univ., Ibaraki (Japan). Tandem Accelerator Center.
Data Taking and Processing System for Experimental Nuclear Physics Study.
Y. Nagashima, H. Kimura, K. Katori, and K. Kuriyama. 1979, 63p
In Japanese.
U.S. Sales Only.

A multi-input, multimode, multiuser data taking and processing system was developed. This system has the following special features. 1) It is a multicomputer system which is constituted of two special processors and two minicomputers. 2) Pseudo devices are introduced to make operating procedures simple and easy; in partaicular, selection or modification of 1 - 8 coincidence mode can be done very easily and quickly. 3) A 16 Kch spectrum storage has 8 partitions. All partitions having floating size are handled automatically by the data-taking software SHINE. 4) On-line real-time data processing can be done. Using the FORTRAN language, the user may prepare the processing software apart from the data-taking software. Under the RSX-11D system software, this software runs concurrently with the data-taking softwarein a multiprogramming mode. 5) Data transmission between arbitrarily external devices and this system can be done. With these communication procedures, not only the data transfer between computers, but also the control of the experimental devices are realized. Like the real-time processing software, this software can be prepared by users and be run concurrently with other softwares. 6) For data monitoring, two different graphic displays are used complementarily. One is a refreshed-type high-speed display. The other is a storage-type large-screen display. Raw data are displayed on the former. Processed data or multiparametric large-volume data are displayed on the latter one. (Atomindex citation 11:509311)

UTTAC-5 PC **A07**/MF **A01**
Tsukuba Univ., Sakura, Ibaraki (Japan). Tandem Accelerator Center.
Annual Report of the Tandem Accelerator Center, Nuclear and Solid State Research Project, University of Tsukuba. April 1, 1977 - March 31, 1978.
1978, 129p
U.S. Sales Only.

In 1977, 12 UD Pelletron tandem accelerator has been operated by the University's researchers and engineers. In addition to opening the tank for regular inspection, we twice met troubles which forced us to change the accelerating tube. The experiences teach us that it needs about 20 days to finish the conditioning after changing the accelerating tube. A sputter ion source of new version is now being installed on the top floor. Two devices for the detection of X-rays were tested. An apparatus for bombardment of samples in air for biological and medical sciences has been successfully used. The subjects of researches on nuclear physics cover the light-ion reactions, heavy-ion reactions and nuclear spectroscopy. A special emphasis has been put on the measurements on vector- and tensor-analyzing powers in the light-ion reactions, because of a higher efficiency of the polarized ion source. Elaborate works on the heavy-ion reactions including the angular correlation patterns and excitation functions have been made in parallel. Papers of these works are now being prepared, a few having been published already. Moreover, in the University of Tsukuba, a new research system, called Special Research Project on Nuclear and Solid State Sciences Using Accelerated Beams (Nuclear and Solid State Research Project), started in 1978 and will continue for five years. In this research project, researchers from various Institutes in the University of Tsukuba, as well as visiting researchers from other institutions in Japan and from abroad, participate. Using a variety of accelerated beams, i.e. of heavy, light and polarized beams, this research project aims mainly at the high excitation, short-life, transient and inhomogeneous states in both nuclear and extra-nuclear world. It covers both fundamental research in nuclear, atomic and solid state sciences as well as their application in various fields. (Atomindex citation 10:438448)

20H. Particle Physics

AD-A088 054/2 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Diocotron Instability of a Relativistic Coaxial Multi-Ring Hollow Electron Beam.
Memorandum rept.,
H. C. Chen, and P. J. Palmadesso. 18 Aug 80, 30p Rept no. NRL-MR-4286

The diocotron stability properties of a relativistic coaxial multi-ring hollow electron beam are investigated using a macroscopic cold fluid description based on moment-Maxwell equations. It is found that for a broad range of beam parameters and somewhat more general type beam profile the growth rate of instability has a sensitive dependence on fractional charge neutralization, relative position of the rings with conducting wall and gap-length of the rings. In the case of a sharp boundary density profile, the beam can be stabilized easily by a small fractional charge neutralization with appropriate gap-length. The growth rate can be either enhanced or reduced depending on the position and gap-length of the rings. (Author)

AD-A088 490/8 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Physics

Stimulated Raman Scattering by an Intense Relativistic Electron Beam Subjected to a Rippled Electric Field,
G. Bekefi, and R. E. Shefer. 12 Feb 79, 8p
AFOSR-TR-80-0612
Grants AFOSR-77-3143, NSF-ENG77-00340
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No abstract available.

AERE-R-9601 PC **A03**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Nuclear Physics Div.
Description of the Transmutation and Activation Data Library UKCTR3.
O. N. Jarvis. Oct 79, 27p
U.S. Sales Only.

The nuclear cross-section data library UKCTRIII provides neutron reaction cross-section data for the energy range from thermal to 15 MeV. It is intended, primarily, for use in studies of transmutation and activation of fusion reactor structural and coolant materials. The present document describes the content and format of the library UKCTRIII. (Atomindex citation 11:507390)

BNL-27981 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Monte Carlo Studies of Non-Abelian Gauge Theories.
M. Creutz. May 80, 19p CONF-800674-1
Contract AC02-76CH00016
Workshop on current problems in high energy particle theory, Bad Honnef, F.R. Germany, 2 Jun 1980.

After some general remarks on the efficiency of various Monte Carlo aigorithms for gauge theories, the calculation of the asymptotic freedom scales of SU(2) and SU(3) gauge theories in the absence of quarks was discussed. There are large numerical factors between these scales when defined in terms of the bare coupling of the lattice theory or when defined in terms of the physical force between external sources. (ERA citation 05:029801)

BNL-27985 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY.
Present Status of the VMI and Related Models.
G. Scharff-Goldhaber. May 80, 21p CONF-800213-12
Contract AC02-76CH00016
Band structure and nuclear dynamics conference, New Orleans, LA, USA, 28 Feb 1980.

This article traces the evolution of the Variable Moment of Inertia model in its relation to the shell model, the Bohr-Mottelson model and the Interacting Boson Model. The discovery of a new type of spectrum, that of pseudomagic nuclei (isobars of doubly magic nuclei) is reported, and an explanation for their dynamics is suggested. The type of rotational motion underlying the ground state band of an e-e nucleus is shown to depend on whether the minimum number of valence nucleon pairs of one kind (neutrons or protons) is less than or equal to 2 or > 2. In the former case the alpha-dumbbell model holds; in the latter the two-fluid model. (ERA citation 05:029817)

BNL-27995 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Confinement and Lattice Gauge Theory.
M. Creutz. Jun 80, 21p CONF-800678-1
Contract AC02-76CH00016
Symposium on topical questions in QCD, Copenhagen, Denmark, 9 Jun 1980.

The motivation for formulating gauge theories on a lattice to study non-perturbative phenomena is reviewed, and recent progress supporting the compatibility of asymptotic freedom and quark confinement in the standard SU(3) Yang-Mills theory of the strong interaction is discussed. (ERA citation 05:029802)

BONN-HE-79-13 PC **A03**/MF **A01**
Bonn Univ. (Germany, F.R.). Physikalisches Inst.
Tensor Product of Two Irreducible Representations of the Spl(2,1) Superalgebra.
M. Marcu. Jul 79, 26p
U.S. Sales Only.

The Clebsch-Gordan series and the unnormalized Clebsch-Gordan coefficients for the tensor product of two irreducible representations of spl (2,1) are given. Special emphasis is laid on the discussion of the structure of the series when it contains several nontypical representations. Thereby a better understanding of the 'degenerate' properties of nontypical representations is gained. (Atomindex citation 11:507282)

BONN-HE-79-14 PC **A03**/MF **A01**
Bonn Univ. (Germany, F.R.). Physikalisches Inst.
Jet Mass Spectra in Perturbative QCD.
L. Clavelli, and H. P. Nilles. Jul 79, 28p
U.S. Sales Only.

Invariant mass spectra of jets are computed for the processes e exp + e exp - q anti q and e exp + e exp - implies exp 3 S sub 1 implies 3g in quantum chromodynamics (QCD). The distributions exhibit a scaling in M exp 2 /s apart from logarithmic violations. At present energies our first order QCD calculation should be reliable for M exp 2 /s > 0.1. The M exp 2 spectra are shown to be very sensitive to heavy flavor thresholds. Possible effects of higher order QCD and non perturbabative smearing are discussed. (Atomindex citation 11:507056)

BONN-HE-79-15 PC **A02**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Lehrstuhl fuer Experimentalphysik 3B und 3. Physikalisches Inst.
Measurement of the Ratio of Neutral to Charged Current Cross Sections of Neutrino Interactions in Hydrogen.
R. Pech. Aug 79, 9p CONF-790648-10
Neutrino 1979 conference, Bergen, Norway, 18 Jun 1979.
U.S. Sales Only.

The ratio R/sub upsilon/ /sup P/ of the neutral current to charged current cross sections has been measured in an exposure of the BEBC bubble chamber filled with hydrogen and exposed to the CERN SPS wideband neutrino beam. Combining the results from hydrogen and isoscalar targets determines, the individual values of the coupling constants u/sub L/ exp 2 and d/sub L/ exp 2 The results are compatible with the standard SU(2) kappa U(1) model. (Atomindex citation 11:507273)

BONN-HE-79-16 PC **A02**/MF **A01**
Bonn Univ. (Germany, F.R.). Physikalisches Inst.
Inclusive Pion Production by Photon-Proton Collisions.
T. Chandramohan. Aug 79, 8p
U.S. Sales Only.

The invariant cross section for pi exp 0 production at large psub(T) in photon-proton collisions is calculated using a hard scattering model. Prediction are also made for charge ratios pi exp + /pi exp - . (Atomindex citation 11:507051)

BONN-HE-79-17 PC **A02**/MF **A01**
Bonn Univ. (Germany, F.R.). Physikalisches Inst.
Multiparticle Bound States in QED.
W. Buchmueller, and K. Dietz. Sep 79, 24p
U.S. Sales Only.

The relation between multiparticle Schroedinger equations and the underlying field theory for weakly coupled systems is clarified. A systematic perturbation theory for the energy levels is presented the first term of which is the eigenvalue of a Schroedinger equation with relativistic kinematics. (Atomindex citation 11:507047)

BONN-HE-79-18 PC **A02**/MF **A01**
Bonn Univ. (Germany, F.R.). Physikalisches Inst.
Quasiparticle Effects in the Two-Body Photodisintegration of exp 4 He.
W. Boettger, A. Casel, and W. Sandhas. Sep 79, 10p
U.S. Sales Only.

The total cross sections for the reactions exp 4 He(gamma ,n) exp 3 He and exp 4 He(gamma ,p) exp 3 H are calculated for photon energies between 50 MeV and 150 MeV in a quasiparticle formalism, leading to a simple interpretation for the gamma -absorption mechanism. Results are compared with shell model calculations. (Atomindex citation 11:507517)

BONN-HE-79-19 PC **A03**/MF **A01**
Bonn Univ. (Germany, F.R.). Physikalisches Inst.
Jet Angular Momentum and Quantum Chromodynamics.
L. Clavelli. Oct 79, 28p
U.S. Sales Only.

Several observable properties of hadronic final states in electron-positron annihilation that bear on the angular momentum content of jets are discussed. In particular the jet oblateness and the jet axis angular distribution are calculated as a function of jet invariant mass in perturbative quantum chromodynamics. QCD information on the Psub(T) correlation in opposite jets is considered. (Atomindex citation 11:507055)

CEA-CONF-4464 PC **A02**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Global Parameters of the Optical Potential for Nuclei from A = 89 to A = 242.
C. Lagrange, and J. P. Delaroche. 1978, 6p CONF-780921-19
In French.Conference on neutron physics and other applied purposes, Harwell, UK, 25 Sep 1978.
U.S. Sales Only.

The phenomenological analysis of extensive neutron data sets over a wide energy range, and for nuclei from A=89 to A=240 permits to obtain a coherent set of the volume integral and of the rms radius of the real and imaginary potentials. These parameters are compared to those obtained from fundamental calculations by Jeukenne, Mahaux, Lejeune. Moreover for heavy deformed nuclei the potential moments are calculated and compared to various results obtained whether from experiments or other analyses. (Atomindex citation 11:496015)

CEA-CONF-4465 PC **A02**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Calculation of the Emission Spectra and Cross Sections in the Griffin's Exciton Model.
O. Bersillon, and L. Faugere. 1978, 4p CONF-780921-15
In French.Conference on neutron physics and other applied purposes, Harwell, UK, 25 Sep 1978.
U.S. Sales Only.

Spectra of emitted particles in nuclear reactions and corresponding cross sections are analysed in the framework of the Griffin's exciton model, without any conventional evaporative component, owing to a new method to solve exactly the master equations. Complex particle emission and multiple emission are compared to experimental results. (Atomindex citation 11:495964)

CEA-CONF-4467 PC **A02**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Nuclear Model Evaluation of Neutron Cross Sections of exp 240 Pu and exp 242 Pu in the Energy Range 10KEV-20MeV.
J. Jary, and C. Lagrange. 1978, 5p CONF-780921-18
In French.Conference on neutron physics and other applied purposes, Harwell, UK, 25 Sep 1978.
U.S. Sales Only.

Coherent calculations of a set of neutron cross sections for exp 240 Pu- exp 242 Pu in the energy range 10 keV-20 MeV using the optical and statistical models are presented. It can be seen that the present analysis shows good general agreement with the various experimental cross sections. (Atomindex citation 11:496008)

CEA-CONF-4549 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Splendor and Misery of the Distorted Wave Method Applied to Heavy Ions Transfer Reactions.
M. C. Mermaz. 1979, 47p CONF-790176-2
17. international winter meeting on nuclear physics, Bormio, Italy, 22 Jan 1979.
U.S. Sales Only.

The success and failure of the Distorted Wave Method (DWM) applied to heavy ion transfer reactions are illustrated by a few examples: one and

multi-nucleon transfer reactions induced by exp 15 N and exp 18 O on exp 28 Si target nucleus performed on the vicinity of Coulomb barrier, respectively, at 44 and 56 MeV incident energy. (Atomindex citation 11:510051)

CEA-CONF-4555 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Evaporation Residue Excitation Functions from Compound Nuclei sub 58128 Ce and sub 57129 La.
J. Poitou, R. Lucas, and J. Girard. 1979, 13p
CONF-790176-3
17. international winter meeting on nuclear physics, Bormio, Italy, 22 Jan 1979.
U.S. Sales Only.

Evaporation residue excitation functions from the compound nucleus in the reactions of exp 63 Cu on exp 65 Cu (51.5<E*<105 MeV) and of exp 84 Kr on exp 45 Sc (55<E*<130 MeV) have been studied by short beam time irradiations and off line identification of the reaction products. Entrance and exit channel effects on the reaction cross-section are discussed. The deexcitation process leads in the Cu + Cu case to a finite probability of evaporation of a single nucleon when the excitation energy is about 55 MeV. This effect is not observed in the Kr + Sc case. This is interpreted in terms of differences in the angular momentum distribution. (Atomindex citation 11:510058)

CEA-CONF-4556 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Complete Fusion in Light 'Heavy Ion' Collisions.
C. Volant, and J. P. Wieleczko. 1979, 14p CONF-790176-4
17. international winter meeting on nuclear physics, Bormio, Italy, 22 Jan 1979.
U.S. Sales Only.

In the last few years a large amount of data have been obtained on the complete fusion of light ions. One of the aim of these studies was to look for aspects which could not be explained by the macroscopic description of the fusion which works quite well for heavier systems. Indeed, it was suggested that for light systems the fusion could be sometimes limited by compound nucleus properties or by some particular structures in the entrance channel. In this talk new results on fusion experiments obtained by the Saclay group are presented. (Atomindex citation 11:510076)

CEA-CONF-4575 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Measurement of Muon Capture Rate in Hydrogen.
C. Bardin, J. Duclos, and A. Magnon. 1979, 6p
CONF-7903110-2
In French.Biennial session on nuclear physics, Aussois, France, 5 Mar 1979.
U.S. Sales Only.

An experiment is in progress at Saclay to measure the muon capture rate on the proton, by comparing the lifetimes of positive and negative muons stopping in liquid hydrogen, with a final accuracy about 3x10 exp -5 . The beam structure of Saclay's linac (3 mu s bunches at a rate of 3000 s exp -1) is used which allows the lifetime measurement after the burst in very favorable conditions. An apparatus has been designed. The result of a very preliminary analysis gives for the capture rate of muons bound in the p mu p system: lambda/sub c/ (p mu p)=472+-45 s exp -1 . (Atomindex citation 11:507506)

CEA-CONF-4576 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Quartets, Supermultiplets and Mass Formulae.
V. Gillet. 1979, 15p CONF-7903110-4
In French.Biennial session on nuclear physics, Aussois, France, 5 Mar 1979.
U.S. Sales Only.

The present calculations and discussions relate directly to the evaluation of absolute masses in the context of an effective Hamiltonian commuting with SU4. It is shown that Quartetting's model greatly improves the results of Weizsaecker's mass formula for intermediate nuclei. The two models give similar results for heavy nuclei. On the other hand Quartetting's model and Wigner's model with pairing are indistinguishible by their results because of the ambiguity due to shell corrections, but Quartetting's model requires two parameters fewer than Wigner's for the same results. The image of an SU4 pseudo-symmetry naturally introduces thre- and four-body interactions represented by 3- and 4-order Casimir operators. The introduction of these extra terms, in spite of the new parameters involved, does not improve the results obtained with two-body forces alone. Within the limits of the errors observed, around 0.5 to 1 MeV, these effects are therefore excluded. Finally the proposed new mass formula with Quartetting's model can be useful for the prediction of neutron-deficient exotic nuclei, as shown by a special application to rubidium and cesium isotopes recently measured at CERN by the ISOLDE collaboration. (Atomindex citation 11:510031)

CEA-CONF-4577 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Electron Magnetic Scattering on Valence Nucleon Orbits.
S. Platchkov, J. B. Bellicard, and J. M. Cavedon. 1979, 14p
In French.
U.S. Sales Only.

Cross-sections for elastic electron scattering by the magnetization distribution of exp 49 Ti, exp 51 V, exp 59 Co, exp 87 Sr and exp 93 Nb have been measured in the range of momentum transfer 1.7 - 3.3 fm exp -1 . The results are interpreted in terms of radial distribution of the unpaired proton or neutron. Meson exchange and core polarization effects are investigated. The valence nucleon radii obtained are compared with Hartree-Fock predictions. (Atomindex citation 11:507582)

CEA-CONF-4595 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Study of the (Exp 16 O, exp 12 C) Reaction on Even Nickel Isotopes at 60 MeV Incident Energy.
B. Berthier. 1979, 22p CONF-790176-1
17. international winter meeting on nuclear physics, Bormio, Italy, 22 Jan 1979.
U.S. Sales Only.

Experimental results and exact finite range DWBA analysis (EFR-DWBA) of (exp 16 O, exp 12 C) transfer reactions on even nickel isotopes are presented. EFR-DWBA calculations which reproduce (exp 16 O, exp 12 C) transfer data using optical model parameters deduced from elastic scattering analysis are shown. The exp 58 Ni, exp 60 Ni, exp 62 Ni, exp 64 Ni(exp 16 O, exp 12 C) exp 62 Zn, exp 64 Zn, exp 66 Zn, exp 68 Zn reactions at 60 MeV incident energy leading to the ground state and the 2 exp + and 3 exp - low lying states in zinc isotopes and the exp 58 Ni, exp 60 Ni, exp 62 Ni, exp 64 Ni + exp 16 O elastic scattering at 60 MeV incident energy and exp 64 Zn, exp 66 Zn, exp 68 Zn + exp 12 C elastic scattering at 54 MeV have been measured in the range of scattering angles theta(c.m.) = 17 exp 0 - 100 exp 0 . (Atomindex citation 11:507513)

CEA-CONF-4597 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Multi-Step Processes in Heavy-Ion Direct Reactions.
B. T. Kim. 1979, 12p CONF-7904135-1
Korean Scientists and Engineers Association in Europe meeting, Seoul, Republic of Korea, 9 Apr 1979.
U.S. Sales Only.

The effects of multi-step processes seen in heavy-ion induced direct reactions leading to discrete final states are discussed. Some typical examples of these reactions taking place predominantly in the asymptotic and peripheral regions are studied. The present multi-step direct reaction theory can explain the observed data of reactions which occur at grazing distances, where the interactions between the colliding ions are relatively well known. This theory also explains the qualitative features of reactions taking place at distances somewhat inside grazing region. (Atomindex citation 11:507397)

CEA-N-2070 PC **A16**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Progress Report of the Nuclear Physics Department.
1979, 354p
In French.
U.S. Sales Only.

These studies concern the structure of nuclei and hypernuclei and various reaction mechanisms. They have been performed with the 8.5 MeV tandem Van de Graaff, with the 600 MeV electron linac, and with different accelerators belonging to other laboratories. (Atomindex citation 11:507530)

CENBG-7813 PC **A10**/MF **A01**
Bordeaux-1 Univ., Gradignan (France). Centre d'Etudes Nucleaires.
Atomic Inner Shell Ionization: A New Method of Nuclear Interaction Lifetimes in the Range 10 exp -16 -10 exp -18 Second. Lifetime Measurement of the Compound Nucleus in the Reaction exp 106 Cd+p (Ep=10 and 12 MeV).
These (D. es S.),
J. F. Chemin. 1978, 205p
In French.
U.S. Sales Only.

A new method to measure the lifetime of the formed in the reaction exp 106 Cd+p at Ep=10 and 12 MeV is described. The nuclear lifetime is compared to the known lifetime of an atomic inner shell vacancy created in the entrance channel of the nuclear reaction. If the ionization probability in the entrance channel of the nuclear reaction is known, the compound nucleus lifetime is deduced by a simple relation from the number of X-rays measured in coincidence with one of the reaction products. A large number of ionization probability values measured in very small impact parameter collisions induced by H exp + , He exp + , D exp + on Al, Cu, S, Ti, Si, Ag, Cd are reported. The data are interpreted in terms of the corrected SCA theory of ionization. New effects such as angular dependence and trajectory effect (hair-pin-curve effect) are shown experimentally. The influence of a nuclear delay time on the ionization probability value is considered; the effect on a nuclear reaction of the energy losses by the projectile during the ionization process is analysed in detail. The yield curve of the resonant nuclear reaction exp 27 Al(p, gamma) exp 28 Si is taken as an example. A detailed analysis of the compound nucleus exp 107 In compoundnucleus lifetime is given. Attention has been paid to competitive processes leading to X ray emission of same energy as the compound nucleus X rays. Extensions of the method to measure compound nucleus lifetimes in collision induced by heavy ions and to separate the shape elastic and compound elastic mechanisms are presented. (Atomindex citation 11:507532)

CNRS-CPT-78-P-1053 PC **A02**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Gauge Invariance of a Particle in an External Magnetic Field.
H. Ekstein. Dec 78, 13p
U.S. Sales Only.

In the accepted theory of a nonrelativistic particle in an external field, as well as in the Dirac equation, the canonical momentum p plays a strangely elusive role: contrary to the position q, it has no physical interpretation, yet it is a member of the algebra of observables; nor does it have a well-defined meaning as a translation generator. This paper proposes an observation procedure for p which entails a definite choice for the vector potential A: the radiation gauge divergence of A=0. The canonical momentum, so defined operationally, is shown to be the image of the generator of space translations, in the sense of presymmetry, as the position q is the image of the generator of Galilei boosts in nonrelativistic theories. (Atomindex citation 11:507076)

CNRS-CPT-79-P-1087 PC **A03**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Dimensional Renormalization and Comparison of Renormalization Schemes in Quantum Electrodynamics.
R. Coquereaux. Feb 79, 33p
U.S. Sales Only.

The method of dimensional renormalization as applied to quantum electrodynamics is discussed. A general method is given which allows one to compare the various quantities like coupling constants and masses that appear in different renormalization schemes. (Atomindex citation 11:509357)

CNRS-CPT-79-P-1097 PC **A03**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
O(Epsilon exp 2) Scaling Law for Dsigma/DT in the Reggeon Field Theory.
J. W. Dash, and T. Grandou. Apr 79, 39p
U.S. Sales Only.

The two loop contributions were calculated within the epsilon-expansion to the Reggeon Field Theory scaling law for dsigma/dt, derived using the renormalization group and a general renormalization point for the Pomeron propagator. This generalizes the O(epsilon) work of Abarbanel, Bartels, Bronzan, and Sidhu. The invariance of the results under certain coupling constant rescalings is demonstrated. Some qualitative comments were made regarding phenomenological applications. Cur amplitude in a certain limit approximates the form of the low-energy diffractive amplitude advocated by Kane. (Atomindex citation 11:509360)

CNRS-CPT-79-P-1101 PC **A12**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Chiral Symmetry in Perturbative QCD.
T. L. Trueman. Apr 79, 271p
U.S. Sales Only.

The chiral symmetry of quantum chromodynamics with massless quarks is unbroken in perturbation theory. Dimensional regularization is used. The ratio of the vector and axial vector renormalization constants is shown to be independent of the renormalization mass. The general results are explicitly verified to fourth order in g, the QCD coupling constant. (Atomindex citation 11:509388)

CNRS-CPT-79-P-1103 PC **A02**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Non-Abelian Gauge Theories in a Background Field.
A. Rouet. May 79, 7p
U.S. Sales Only.

Green functions of on mass shell transverse gauge fields in a background gauge are proved to be obtained from Green functions in the perturbative vacuum by a mere translation. (Atomindex citation 11:509385)

CNRS-CPT-79-P-1106 PC **A03**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Color, Flavor, Duality and the Pomeron.
J. W. Dash, S. T. Jones, and A. Martin. May 79, 43p
U.S. Sales Only.

The idea is considered that the Harari-Freund (HF) P+f model of diffraction is valid at N/sub c//N/sub f/ = infinity where the P is naturally identified with QCD glue, but that at N/sub c/ = 3 the Chew-Rosenzweig-Chan P-f identity dominates. This transition can be effected by the emergence of quark-produced scales and by the suppression of glueball effects through virtual quark loops. N/sub c/ = 3 models for the cylinder or bare P are reviewed. Rather mixed phenomenological results are presented. The recently observed failure of f pole-resonances duality in pi N scattering for conventional p+f parametrizations is confirmed. Finally flavoring renormalization in the p+f model is examined. Acceptable p+f fits to sigma/sub NN/ and sigma/sub pi N/ are found, if the unflavored P intercept is 0.9 and the flavored P intercept is 1.1. Moreover, we are able to find solutions which satisfy both strong f-w EXD and f-pole resonance duality approximately. Thus, flavoring seems to play a significant role in P+f phenomenology as well as in P-f identity phenomenology. (Atomindex citation 11:509359)

COO-3130-2 PC **A03**/MF **A01**
Brown Univ., Providence, RI. Dept. of Physics.
How Well Do We Know the Quantum Numbers of Possible Anti p p Implies M sub 1 M sub 2 States.
R. E. Lanou. 1979, 33p CONF-7906176-1
Contract AC02-76ER03130
Workshop on baryonium and multiquark states, Orsay, France, 21 Jun 1979.

Information is available to completely analyze the p anti p implies pi pi reaction, allowing more global, large-scale, phenomenological analyses which combine the two experimental data sets in an energy independent, amplitude analysis which also includes pion-nucleon data. It would appear from the preliminary analyses of p anti p implies M sub 1 M sub 2 angular distributions and polarizations the T-region may indeed contain some very interesting activity. (ERA citation 05:029788)

COO-3130-423 PC **A02**/MF **A01**
Brown Univ., Providence, RI. Dept. of Physics.
Introduction to Grand Unification Theories.
K. Kang. 1980, 14p CONF-800374-4
Contract AC02-76ER03130
15. Rencontre de Moriond, Les Arcs, France, 9 Mar 1980.

The Georgi-Glashow model is introduced based on the minimal gauge group SU(5) as a prototype grand unification theory of the electroweak and strong interactions. Simple estimation of sin exp 2 theta/sub W/ in the symmetry limit and the renormalization corrections at the energy scale of M/sub W/ are given along with other successes of the SU(5) model. (ERA citation 05:029803)

DESY-79/51 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Dynamics of the Reaction gamma p Implies p Anti Pp at Energies Between 4.7 and 6.5 GeV.
J. Bodenkamp, D. C. Fries, A. Markou, E. Seitz, and H. J. Behrend. Aug 79, 5p
U.S. Sales Only.

In a photoproduction experiment at DESY the reaction gamma p implies p anti pp has been investigated. The basic dynamics by which this reaction proceeds has been identified. (Atomindex citation 11:507045)

DESY-79/55 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Explicit Parametrization of the General SU(2) Instantons.
A. Casher. Aug 79, 12p
U.S. Sales Only.

The 8k-3 parameters of the general SU(2) Yang Mills instanton of topological number k are identified. 8k-4 of the parameters are certain 'angles' of the quotient group Su(2k + 2)/Su(2k) x SU(2) and one is an overall scale. (Atomindex citation 11:506239)

DESY-79/58 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Recent Results on the Instanton Approximation.
B. Berg. Sep 79, 18p CONF-7908115-1
Kaiserslautern conference on field theoretical methods in elementary particle physics, Kaiserslautern, F.R. Germany, 13 Aug 1979.
U.S. Sales Only.

Recent results on the two-dimensional CPsup(N-1) models suggest that the QCD instanton gas is dense and infrared finite. These results and the computation of quantum fluctuations of quarks in a multi-instanton background are reviewed. (Atomindex citation 11:507036)

DESY-79/60 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).

Quark and Particle Helicities in Hadronic Charmed Particle Decays.
J. G. Koerner, and G. R. Goldstein. Sep 79, 16p
U.S. Sales Only.

We investigate possibilities of obtaining information on the chirality of the charm-changing current (antics) by measuring the helicities of hadrons with spin in exclusive hadronic charmed particle decays. (Atomindex citation 11:509685)

DESY-79/63 PC **A04**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Heavy Quarks in E exp + E exp - Annihilation.
A. Ali, J. G. Koerner, G. Kramer, and J. Willrodt. Oct 79, 51p
U.S. Sales Only.

We calculate the effects of the pair production of top quarks and their subsequent weak decays on event topologies and inclusive distributions in e exp + e exp - annihilation experiments. The resulting jet distributions are compared with those originating from the lighter quarks (u, d, s, c, b) with higher order QCD corrections included. The calculation is based on the Kobayashi-Maskawa model for the weak decay of the heavy quarks including nonleptonic and semileptonic decay modes. The final evolution of quarks into hadrons has been taken into account using a quark fragmentation model. We find that the jet measures such as sphericity, thrust and acoplanarity are very sensitive to the onset of a new quark threshold in e exp + e exp - experiments. A comparison is made with available data from PETRA in the energy range 13 <= E cm <= 31.6 GeV in order to test the model below the t anti t production threshold. (Atomindex citation 11:507024)

DESY-79/70 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Search for New Flavor Production at PETRA.
W. Bartel, T. Canzler, D. Cords, P. Dittmann, and R. Eichler. Oct 79, 4p
U.S. Sales Only.

The topological distribution of hadrons from the reaction e exp + e exp - implies multihadrons has been studied at PETRA energies between sqrt s = 22 and 31.6 GeV. No evidence is seen for spherical events which would be expected if massive particles bearing new flavors were produced. (Atomindex citation 11:509950)

DOE/ER-0061 PC **A05**/MF **A01**
Department of Energy, Washington, DC. Div. of Nuclear Sciences.
Summaries of FY 1980 Research in the Nuclear Sciences.
Jun 80, 88p

A compilation and index of the projects funded in fiscal year 1980 by the DOE Division of Nuclear Sciences/Office of Basic Energy Sciences is provided. These summaries constitute the basic document by which the DOE nuclear sciences program can be made known in some technical detail to interested persons. (ERA citation 05:029806)

DOE/ER/01388-441 PC **A03**/MF **A01**
Washington Univ., Seattle.
Charge Distributions for the exp 86 Kr + exp 139 La System at 505, 610, and 710 MeV.
P. Dyer, M. P. Webb, R. J. Puigh, R. Vandenbosch, and T. D. Thomas. 1980, 45p
RLO-1388-441
Contract AC06-76ER01388

Nuclear charge distributions for projectile-like and fission-fragment-like reaction products were measured as a function of angle and energy loss at each of the three bombarding energies E/sub L/ = 505, 610, and 710 MeV for the exp 86 Kr + exp 139 La reaction. The charge distributions at most angles and energy losses are dominated by a peak centered close to the Z of the projectile. The variances of the Z distributions of this component exhibit a different dependence on energy loss at each of the three bombarding energies. A nucleon exchange model incorporating the effects of the Fermi motion and Pauli Principle is quite successful in accounting for the rate of energy loss per exchange deduced from the charge distriction data.

This result suggests that nucleon exchange is the major mechanism for energy dissipation in these collisions. The data are also analyzed in the framework of a phenomenological model, from which diffusion constants are obtained. For large energy losses a second peak appears in the charge distribution with a most probable Z equal to one-half the sum of the projectile and target Z. This component is attributed to fusion-fission. The magnitude of the fusion-fission cross section at 505 and 610 MeV is larger than TDHF predictions. 12 figures, 2 tables. (ERA citation 05:029811)

DOE/ER/01388-443 PC **A02**/MF **A01**
Washington Univ., Seattle. Dept. of Physics.
Radiative Capture Studies of the Electromagnetic Decays of Highly Excited States.
K. A. Snover. 1980, 11p RLO-1388-443, CONF-800540-2
Contract AC06-76ER01388
International symposium on highly excited states in nuclear reactions, Osaka, Japan, 12 May 1980.

Selected examples of interesting E1, M1, and E2 resonance studies in (p, gamma) and (alpha , gamma) reactions are discussed. These include a unique determination of E1 amplitudes in the exp 12 C(P, gamma sub 0) exp 13 N reaction, E2 strength in light nuclei, M1 decays to the ground states and to the excited O exp + states of the doubly magic exp 16 O and exp 40 Ca nuclei, second harmonic E1 resonances in (p, gamma), and M1 gamma -decay of stretched particle-hole states in exp 16 O and exp 28 Si. (ERA citation 05:029809)

DOE/ER/10353-1 PC **A02**/MF **A01**
New York Univ., NY. Courant Inst. of Mathematical Sciences.
Computational Methods for the Nuclear and Neutron Matter Problems. Progress Report.
M. H. Kalos. 1979, 13p
Contract AC02-79ER10353

A brief report is given of progress on the development of Monte Carlo methods for the treatment of both simplified and realistic models of extensive neutron and nuclear matter and, eventually, of finite nuclei. A wide class of algorithms that may allow the efficient sampling of the integrands required in calculating the energy expectations with useful trial wave functions was devised. (ERA citation 05:029813)

DOE/ER/70004-261 PC **A02**/MF **A01**
Oregon Univ., Eugene.
Theory of Elementary Particles. Annual Report, 1979.
1 Oct 79, 7p RLO-2230-TA4-261
Contract EY-76-S-06-2230-004

Activities for 1979 in the following areas are very briefly summarized: dileptonic processes (hadron-hadron collisions, photon-photon collisions, leading log approximation), ladder approximations in QCD, quark models (clustering, the recombination model), weak interaction phenomenology, nonleptonic decays, grand unification, neutrino pairing, polarization phenomena (general theory, polarization studies of the deuteron, lambda polarization), deuteron targets, and electron beams. There are no data. (ERA citation 05:029792)

ECN-78 PC **A03**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Contribution of (N,p) and (N, alpha) Reactions to Fission-Product Capture Cross Sections.
H. Gruppelaar, and B. P. J. ven den Bos. Oct 79, 36p
U.S. Sales Only.

In recent fission-product cross section libraries evaluated (n,p) and (n, alpha) cross sections are lacking for most of the nuclides. To estimate these cross sections, calculations with a semi-empirical model of Pearlstein have been performed. The calculated excitation functions were renormalized at 14.5 MeV to experimental data, recently compiled by Qaim, or to data from recent systematics of Kumabe and Fukuda. The shapes of the excitation functions were checked against available experimental data. Group cross sections of pseudo fission products for a fast power reactor at a burn-up of 41 MWd/kg have been calculated. It was found that only in the highest energy-group (6.5 to 10.5 MeV) do the (n,p) and (n, alpha) cross sections give important contributions to the absorption cross section. However, this group contributes only marginally to the total spectrum-averaged fission-product absorption. Most of the remaining discrepancies between various evaluated capture cross sections in the energy range above 1 MeV have to be ascribed to differences in nuclear models used for the calculation of sigma/sub n gamma //. (Atomindex citation 11:509979)

FEI-904 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
ARAMAKO-2F Version of the System of Constant Software of High-Energy Neutron Transport Calculation.
M. Yu. Vyrskii, A. A. Dubinin, and A. A. Klintsov. 1979, 18p
In Russian.
U.S. Sales Only.

The organization of the BND-14 neutron data library of the ARAMAKO system is described. The library is intended for the provission of neutron transport software in the energy range lower than 14 MeV. The BND-14 library is now organized with five groups in the 2.5-14 MeV energy range. Group distribution coincides with corresponding distribution of 26-group system of constants in the energy range lower than 10.5 MeV. Two groups are singled out in the range of 10.5-14 MeV, i.e. the former with energies from 10.5 MeV to 14 MeV, the latter has the 1 keV width and is fixed at 14 MeV. Information for 25 isotopes has been written recently into the library, the data being obtained on the basis of reprocessing of estimated nuclear data of the ENDL library (version of 1975) and the UKNDL library (version of 1973). The FL-14 and MIX subprograms are described. They serve the p BND-14 library and rovide for its conjunction with output files of the ARAMAKO-2F complex. (Atomindex citation 11:509314)

FRNC-TH-861 PC **A10**/MF **A01**
Paris-11 Univ., Orsay (France).
Renormalized G-Convolution of n-Point Functions in Quantum Field Theory. I. The Euclidean Case.
These (D. es S.),
J. Bros, M. Manolessou-Grammaticou, and Marietta Manolessou-Grammaticou. 1977, 217p
In French, English.
U.S. Sales Only.

The notion of Feynman amplitude associated with a graph G in perturbative quantum field theory admits a generalized version in which each vertex v of G is associated with a general (non-perturbative) nsub(v)-point function Hsup(nsub(v)), nsub(v) denoting the number of lines which are incident to v in G. In the case where no ultraviolet divergence occurs, this has been performed directly in complex momentum space through Bros-Lassalle's G-convolution procedure. The authors propose a generalization of G-convolution which includes the case when the functions Hsup(nsub(v)) are not integrable at infinity but belong to a suitable class of slowly increasing functions. A finite part of the G-convolution integral is then defined through an algorithm which closely follows Zimmermann's renormalization scheme. The case of Euclidean four-momentum configurations is only treated. (Atomindex citation 11:509351)

HEDL-SA-2134-FP PC **A02**/MF **A01**
Triangle Universities Nuclear Lab., Durham, NC.
Phenomenology of Preequilibrium Angular Distributions.
C. Kalbach, and F. M. Mann. May 80, 21p CONF-800551-19
Contract AC14-76FF02170
Symposium on neutron cross sections from 10 - 50 MeV, Upton, NY, USA, 12 May 1980.

The systematics of continuum angular distributions from a wide variety of light ion nuclear reactions have been studied. To first order, the shape of the angular distributions have been found to depend only on the energy of the outgoing particle and on the division of the cross section into multi-step direct and multi-step compound parts. The angular distributions can be described in terms of Legendre polynomials with the reduced polynomial coefficients exhibiting a simple dependence on the outgoing particle energy. Two integer and four continuous parameters with universal values are needed to describe the coefficients for outgoing energies of 2 to 60 MeV in all the reaction types studied. This parameterization combined with a modified Griffin model computer code permits the calculation of double differential cross sections for light ion continuum reactions where no data is available. (ERA citation 05:029816)

IA-1345 PC **A08**/MF **A01**
Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center.
Measurement of Fission Yields Far from the Center of Isotopic Distributions in the Thermal Neutron Fission of exp 235 U.
Thesis,
M. Shmid. Aug 79, 158p
In Hebrew.
U.S. Sales Only.

The main purpose of this work was to measure independent yields, in the thermal neutron fission of exp 235 U, of fission products which lie far from the centers of the isotopic and isobaric yield distributions. These measurements were used to test the predictions of semi-empirical systematics of fission yields and theoretical fission models. Delay times were measured as a function of temperature in the range 1200-2000degC. The very low delay times achieved in the present work permitted expanding the measurable region to the isotopes exp 147 , exp 148 Cs and exp 99 Rb, which are of special interest in the present work. The delay times of Sr and Ba isotopes achieved were more than two orders of magnitude lower than values reported in the literature, and thus short-lived isotopes of these elements could be separated for the first time by mass spectrometry. The half-lives of exp 147 Ba, exp 148 Ba, exp 149 La and exp 149 Ce were measured for the first time. The isotopic distributions of fission yields were measured for the elements Rb, Sr, Cs and Ba in the thermal neutron fission of exp 235 U, those of exp 99 Rb, exp 147 Cs and exp 148 Cs having been measured for the first time. A comparison of the experimental yields with the predictions of the currently accepted semi-empirical systematics of fission yields, which is the odd-even effect systematics, shows that the systematics succeeds in accounting for the strong odd-even proton effect and the weaker odd-even neutron effect and also in predicting the shape of the distributions in the central region. It is shown that prompt neutron emission broadens the distribution only slightly in the wing of heavy isotopes and more significantly in the wing of light isotopes. But the effect of prompt neutron emission cannot explain the large discrepancies existing between the predictions of fission models and the experimentally measured fission yield in the wings of the isotopic distributions. (Atomindex citation 11:507597)

IC-77-116 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Supersymmetric Model as a Constrained System.
N. S. Baaklini. Oct 77, 9p
U.S. Sales Only.

Dirac's method of quantizing constrained systems is applied to the supersymmetric Wess-Zumino model. The corresponding expression for the path integral is obtained. (Atomindex citation 09:415125)

ICEFIZ-HE-93-1978 PC **A02**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Selection Criteria of Pion Helium Elastic Events in the JINR High Pressure Streamer Chamber.
T. Angelescu, A. Mihul, R. Garfagnini, G. Piragino, and V. I. Falomkin. Jul 78, 9p
U.S. Sales Only.

The study of the interactions of pions with helium-3 and helium-4 nuclei as well as the study of the pion-deuterium and pion-tritium interactions can give interesting results concerning the many-nucleon systems, the existence of any resonant states, the value of the pion formfactor, the coupling constant (pi exp 3 He exp 3 H) value and so

on. Relying on these considerations, we undertook during recent years a study of the elastic scattering of the positive and negative pions on helium-3 and helium-4 nuclei in the energy range from 68 to 208 MeV. The study has been done by using a streamer chamber filled with helium gas at a pressure of 4 atmospheres. The elastic differential cross section data obtained by us, though on rather small statistics, have the advantage of covering a wide range in energy, both for pi exp + and pi exp - interactions on helium-3 and helium-4, using the same experimental method, a fact which gave the possibility of a coherent analysis of the results. Data on pion-helium-3 elastic scattering are the first experimental results of that kind obtained up to now. In this work we describe the method used in processing the experimental data in order to establish the possible systematic errors of the final distributions. (Atomindex citation 11:509940)

ICEFIZ-HE-94-1978 PC **A02**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Corrections for the Efficiency of the Triggering System of Elastic Pion Helium Interactions in the JINR High Pressure Streamer Chamber.
T. Angelescu, I. Doniciu, A. Mihul, L. Pascu, and R. Garfagnini. Jul 78, 8p
U.S. Sales Only.

No abstract available.

ICEFIZ-HE-96-1979 PC **A03**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Neutral Strange Particle Production in pi exp - p Interactions at 16 GeV/C.
E. Balea, S. Berceanu, C. Coca, A. Sararu, and M. V. Karnaukhov. Jun 79, 41p
U.S. Sales Only.

The production of K/sub s/ exp 0 , lambda and anti lambda in pi exp - p interactions at 16 GeV/c is investigated. Cross sections for production of a single strange particle are determined, both inclusively and as functions of the charge multiplicity. Some characteristics of the multiplicity distributions are also discussed. Inclusive distributions are studied as function of longitudinal and transverse variables of V exp 0 and missing mass squared. The average charged multiplicities of the systems recoiling against the lambda and K/sub s/ exp 0 are presented. (Atomindex citation 11:509948)

ICEFIZ-NP-1-1978 PC **A02**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
GIGMF - A Statistical Model Program.
G. Vladuca, and C. Deberth. Jan 78, 23p
U.S. Sales Only.

The program GIGMF computes the differential and integrated statistical model cross sections for the reactions proceeding through a compound nuclear stage. The computational method is based on the Hauser-Feshbach-Wolfenstein theory, modified to include the modern version of Tepel et al. Although the program was written for a PDP-15 computer, with 16K high speed memory, many reaction channels can be taken into account with the following restrictions: the projectile spin must be less than 2, the maximum spin momenta of the compound nucleus can not be greater than 10. These restrictions are due solely to the storage allotments and may be easily relaxed. The energy of the impinging particle, the target and projectile masses, the spin and paritjes of the projectile, target, emergent and residual nuclei the maximum orbital momentum and transmission coefficients for each reaction channel are the input parameters of the program. (Atomindex citation 11:496049)

IFIN-FT-153-1978 PC **A02**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Production Cross Section in the Synthesis of Transfermium Elements.
M. T. Magda, M. Duma, and A. Sandulescu. May 78, 23p
U.S. Sales Only.

It is shown that the maximum of the complete fusion cross sections as a function of various target - projectile combinations, for obtaining low excited transfermium elements in heavy ion compound nucleus reactions, corresponds to the same target-projectile combination as suggested by the fragmentation theory. Calculations based on the computer code OVERLAID ALICE also show that the production cross section after emission of light particles from the low excited compound nucleus is maximum for the same target-projectile combination. The calculations are illustrated on the compound nucleus exp 252 102. (Atomindex citation 11:510049)

IFIN-FT-158-1978 PC **A02**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
High Mass-Asymmetry Distributions of Fissioning Nuclei.
A. Sandulescu, H. J. Lusting, J. Hahn, and W. Greiner. Jul 78, 12p
U.S. Sales Only.

It is shown that new mass-asymmetry valleys are appearing in the fragmentation potential V(l,eta) as function of the length l and mass-asymmetry coordinate eta = (A sub 1 - A sub 2)/to a correct treatment of the shell effects such that for separated fragments the shell effects equal the sum of the shell effects of the individual fragments and correspond to the double magic fragments exp 48 Ca, exp 78 Ni, exp 132 Sn and exp 208 Pb or maybe exp 56 Ni. Also it is shown that the fission mass-distributions have additional peaks corresponding to the bottom of these new valleys. The calculations are illustrated for exp 252 No and exp 238 U. The preliminary results show for exp 238 U relatively high percent yields in agreement with present available experimental data. (Atomindex citation 11:510062)

IFIN-FT-162-1978 PC **A02**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Axial Anomaly in Nonrenormalizable Theories.
S. Marculescu, and L. Mezincescu. Oct 78, 6p
U.S. Sales Only.

The anomaly for the axial current in nonrenormalizable theories with electromagnetic coupling is considered. The spinor electrodynamics with Pauli term is examined in detail using the Feynman graph technique and the point-splitting method. The same finite value for the axial anomaly emerges. (Atomindex citation 11:509378)

IFIN-NP-6-1978 PC **A02**/MF **A01**
Institutul de Fizica si Inginerie Nucleara, Bucharest (Romania).
Critical Angular Momentum Dependence of the Fission Barriers and the Stability of Superheavy Nuclei.
M. T. Magda, and A. Sandulescu. Oct 78, 8p
U.S. Sales Only.

Measured complete fusion and evaporation cross section data are used to determine the critical angular momenta for which the fission barriers are vanishing in the region of nuclei with Z = 102 - 116. It is shown that, in order to fit these data, larger values of the critical angular momenta are obtained for superheavy nuclei (Z = 110 - 112) than for heavy ones (Z = 102 - 107), which indicates a relatively higher stability against fission for superheavy nuclei, in agreement with the theoretically predicted island of stability. (Atomindex citation 11:496019)

IFTM-NP-2-1978 PC **A06**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Decay Schemes and Parameters of Moessbauer Isotopes.
D. Barb, and M. Morariu. Apr 78, 106p
U.S. Sales Only.

An up-to-date compilation of nuclear data containing the main nuclear properties and parameters of the Moessbauer isotopes and their nuclear schemes regarding low-energy transitions is presented. We have also considered it useful to add a Moessbauer periodic table and a list of possible Moessbauer transitions. We consider that all these data as well as the table for unit transformations used in Moessbauer spectroscopy attached to the end of this paper will be of valuable help for the specialists working in the field of Moessbauer spectroscopy. (Atomindex citation 11:510093)

IFVE-OEIPK-79-41 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.

Inclusive Strange Particle Production in pi exp + p Interactions at 32 GeV/c.
I. V. Azhinenko, Yu. A. Belokopytov, and A. A. Borovikov. 1979, 24p
In Russian.
U.S. Sales Only.

The production of K/sub s/ exp 0 , lambda and anti lambda is measured in pi exp + p interactions at 32 GeV/c. The total inclusive cross sections are found to be 2.07+-0.14, 1.00+-0.10 and 0.14+-0.04 mb, respectively. The energy dependence of total inclusive cross sections and inclusive distributions is discussed, and a comparison is made with p, anti p, K exp + and K exp - reactions. It is found that the factorization hypothesis is satisfied for the inclusive reactions pi exp + p implies lambda X and K exp + p implies lambda X. Multi-strange-particle production is similar in pi exp + p and K exp + p interactions at 32 GeV/c. There is evidence for beam fragmentation in anti lambda production. The hierarchy of anti lambda inclusive cross sections in anti p, K exp + , pi exp + and K exp - reactions at 32 GeV/c is qualitatively explained by the quark recombination model. The cross sections for inclusive K/sup integral) exp + (892) and sigma exp + (1385) production in 32 GeV/c pi exp + p interactions are 1.07+-0.57 and 0.19+-0.08 mb, respectively. (Atomindex citation 11:509944)

INIS-mf-5457 PC **A08**/MF **A01**
Erlangen-Nuernberg Univ. (Germany, F.R.). Fachbereich Naturwissenschaft.
Study of the Reaction exp 114 Cd(P,p') at E/ sub p/ = 11 MeV Using Polarized Protons and p sub 1 gamma -Angular Correlation.
S. Schneider. 23 Nov 77, 159p
In German.Thesis.
U.S. Sales Only.

The differential cross sections and analyzing powers have been measured for elastic and inelastic proton scattering on exp 114 Cd. The incoming 11 MeV protons are produced by the Erlangen tandem accelerator. Furthermore, the doubly differential cross sections have been determined for (p sub 1 gamma) angular correlation of polarized and unpolarized protons. The data are detected by a multidector setup consisting of 11 silicon surface barrier detectors for detection of the scattered protons and 2 Ge(Li) detectors for gamma detection. For the measurements of (p gamma) correlation the particle detectors and gamma detectors form fast-slow coincidence circuits. The 'polarized' doubly differential cross section has been measured for six different positions of the gamma detector in the reaction plane, as well as the 'unpolarized' doubly differential cross section, which has been determinded in addition in a position directly above the reaction plane (in-flip geometry). Based on the polarized and unpolarized differential and doubly differential cross sections, the experimental analyzing powers and correlation symmetries have been derived, respectively; together with the inelastic differential cross sections the unpolarized doubly differential cross sections determine the experimental angular correlation functions. (Atomindex citation 11:507593)

INIS-mf-5460 PC **A02**/MF **A01**
Bonn Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet.
Special Aspects of Weak Decays with Regard to the Detection of New Hadrons and Leptons.
H. P. Nilles. 30 Nov 78, 14p
In German.Thesis.
U.S. Sales Only.

Phenomenological aspects of the weak interaction were investigated with regard to criteria for the detection of new particles of higher mass (B, L exp 0). Predictions for the weak decays of heavy hadrons with new quantum numbers (e.g. Bottom) require an understanding of the different semileptonic branching ratios (about 1/100) of K and D mesons. In chapter 2, the non-leptonic decays of strange and charmed mesons were investigated in order to explain this discrepancy, using two-dimensional QCD as a model for the calculation of the influence of strong interaction on the weak decays. The semileptonic decays of bottom mesons led to di-, tetra- and tetralepton events in e exp + e exp - annihilation experiments. Chapter 3 points out that the bottom particles can be detected by measuring

these multilepton rates. As the model-independent analysis of the author shows, the semileptonic branching ratio, the relative strength of the bc and bu couplings, and the B exp 0 -B exp -0 mixing can thus be directly determined. It was found already for the case of the heavy lepton tau that a direct extrapolation of the weak interaction to the purely leptonic decays of heavy leptons is possible. In chapter 4, the production and decay of a heavy neutral muon L exp 0 in UPSILON mu (mu exp +-) scattering are investigated. (Atomindex citation 11:507165)

INIS-mf-5473 PC **A08**/MF **A01**
Groningen Rijksuniversiteit (Netherlands).
High Resolution Study of Four Pickup Reactions on SD-Shell Nuclei.
J. C. Vermeulen. 17 Sep 79, 158p
Thesis.
U.S. Sales Only.

High quality data for the (d, exp 6 Li) reaction on the target nuclei (exp 24 Mg, exp 25 Mg, exp 26 Mg, exp 27 Al and exp 28 Si) have been obtained at a bombarding energy of 55 MeV. Angular distributions for in total about 200 transitions have been obtained for the five target nuclei studied and for laboratory angles between 10 exp 0 and 37 exp 0 . All cross-sections observed were smaller than 30 mu b/sr, and for most of the transitions on the order of 1 mu b/sr. The angular distributions display a very different behavior for different values of the transferred angular momentum. Transitions to states with known spins and parities have been analyzed in the framework of the DWBA, with the assumption of direct alpha -cluster pick-up. 'Zero-range' (ZR) as well as 'finite-range' (FR) calculations have been performed. Relative alpha -spectroscopic factors have been extracted by means of this analysis and have been compared to the predictions of the SU(3) model and the shell model. Some attention has been paid to the importance of other than direct cluster pick-up reaction mechanisms, in particular to the importance of two-step processes in which the transfer of a cluster is followed by inelastic excitation of the residual nucleus. (Atomindex citation 11:507605)

INIS-mf-5511 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekttraegerschaft Mittelenergyphysik.
Technical Report 1976 on the BMFT Project Medium-Energy Physics (MEP) At the GfK.
1976, 24p
In German.
U.S. Sales Only.

The research connected with the named project is described. In particular, mesic and muonic atoms, nuclear reactions with pions, the structure determination by meson beams, and the application of negative pions to radiotherapy are studied. (Atomindex citation 11:514768)

INS-R-231 PC **A03**/MF **A01**
Department of Scientific and Industrial Research, Lower Hutt (New Zealand). Inst. of Nuclear Sciences.
Nuclear Physics Group Progress Report January - June 1977.
G. J. McCallum. Aug 77, 26p INS-873
U.S. Sales Only.

Research activities are summarized. Headings are: Accelerator; Instrumentation; Experimental program, which includes measurements of nitrogen in steels, x-ray fluoresence analysis (both proton and x-ray induced), production of exp 13 N and exp 11 C for tracer studies and nuclear magnetic resonance. (Atomindex citation 09:412282)

INS-784 PC **A06**/MF **A01**
Department of Scientific and Industrial Research, Lower Hutt (New Zealand). Inst. of Nuclear Sciences.
Report on the Work of the Institute of Nuclear Sciences 26 July–December 1975.
Apr 76, 111p
U.S. Sales Only.

The work of the New Zealand Institute of Nuclear Sciences during the period January-June 1975 is summarized under the following headings: A) Nuclear Physics; B) Radiation Research; C) Isotope Geochemistry - Stable Isotopes; D) Radiocarbon Dating and Fallout; E) Radioisotope Applications; F) Instrumentation. Appendices on current research projects, staff publications and library holdings are included. (Atomindex citation 09:412272)

INS-888 PC **A10**/MF **A01**
Department of Scientific and Industrial Research, Lower Hutt (New Zealand). Inst. of Nuclear Sciences.
Report on the Work of the Institute of Nuclear Sciences 27 January–December 1976.
Oct 77, 212p
U.S. Sales Only.

The work of the New Zealand Institute of Nuclear Sciences during the period January-June 1975 is summarized under the following headings: A) Nuclear Physics; B) Radiation Research; C) Isotope Geochemistry - Stable Isotopes; D) Radiocarbon Dating and Fallout; E) Radioisotope Applications; F) Instrumentation. Appendices on current research projects, staff publications and library holdings are included. (Atomindex citation 09:412273)

IPNO-PhN-77-27 PC **A04**/MF **A01**
Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire.
Exp 31 P(exp 3 He,D) exp 32 S Reactions at 25MeV.
J. Kalifa, J. Vernotte, Y. Deschamps, F. Pougheon, and G. Rotbard. 1977, 53p
U.S. Sales Only.

The exp 31 P(exp 3 He,d) exp 32 S reaction was investigated at 25 MeV incident energy. One hundred and eleven levels up to an excitation energy of 12.5 MeV were observed using a split-pole magnetic spectrograph. The experimental angular distributions were analyzed with the distorted-wave Born approximation. The optical model parameters used in the DWBA calculations were obtained from a fit to elastic exp 3 He scattering data taken on exp 31 P at 25 MeV. Gamov functions were used as form factors for the transferred proton in the case of unbound states. Values of the transferred orbital angular momenta l and spectroscopic strengths were obtained for sixty levels, with many odd-parity levels being observed above 9 MeV excitation. Spin and parity assignments were made upon the basis of the l-values obtained from the shapes of the angular distributions and upon comparison with the results of other reactions. Isospin assignments were made by comparison with exp 32 P levels. Except for the l/sub P/ = 1, T = 0 transfers, most of the observed spectroscopic strength is concentrated into a few levels. The existence of a T-mixed doublet of levels, J/sup pi / = 1 exp - , is suggested in the 11 MeV region of excitation. The excitation energies and spectroscopic strengths are compared with results of a recent shell-model calculation. (Atomindex citation 10:447610)

IPNO-TH-78-22 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Microscopic Description of alpha -Nucleus Interaction.
N. Vinh Mau. 1978, 17p
U.S. Sales Only.

A model is proposed where the first term leads to the double folding model real potential including exchange between one nucleon in the target and one nucleon in the projectile. The next terms are expressed in terms of diagonal and non diagonal target ground state densities and lead to a correction to the real potential and to the imaginary potential. Numerical results are presented for alpha - exp 40 Ca optical potential. (Atomindex citation 11:496047)

IPNO-TH-78-46 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Parametrization of the Paris N-N Potential.
M. Lacombe, B. Loiseau, J. M. Richard, R. Vinh Mau, and J. Cote. Nov 78, 18p
U.S. Sales Only.

In view of practical nuclear structure calculations the Paris N-N potential is parametrized in a simple analytical form. This parametrization consists of a regularized discrete superposition of Yukawa type terms. Results for phase shifts and deuteron parameters are presented as well as nuclear matter binding energy obtained with this potential. (Atomindex citation 11:496014)

IPNO-TH-79-14 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Topological Classification of the Yield-Mass Curves of Fission Fragments.
R. da Silveira. Mar 79, 12p
In French.
U.S. Sales Only.

Using a topological model of Catastrophe Theory, there is proposed a classification of the yield-mass curves of fission fragments according to their morphologies. From this classification it appears that the well-known asymmetric component for fission of nuclei heavier than Fr would probably emerge and gradually increase from Bi or Po. (Atomindex citation 11:507456)

ITEF-174(1978) PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
General Positions of the Unified Theory of Nuclear Reactions and Nuclear Structure in Formalism of Quantum Green Functions.
E. S. Rzhevskii. 1978, 26p
In Russian.
U.S. Sales Only.

The approach to the unified description of nuclear reactions and nuclear structure based on the formalism of the quantum Green functions and notions of the theory of finite Fermi systems is stated. The multiparticle effective forces of quasi-nucleon interactions in the nucleus are introduced. The T matrix of the nuclear reaction is presented in the form of expansion of a number of multiparticle collisions in a system up to its transition to a final state. It is shown that the T matrix and optical potentials along with wave functions of nuclei and secular equations are determined by the same structural vertices, being responsible for quasi-nucleon collectivization. The interpretation of the well-known method of strength functions is given. (Atomindex citation 11:507448)

ITEF-23(1979) PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Backward Emission of Protons in Nuclear Reactions under Irradiation of 400 GeV Protons.
Yu. D. Bayukov, V. I. Efremenko, Yu. M. Zaitsev, G. A. Leksin, and N. A. Nikiforov. 1979, 29p
In Russian.
U.S. Sales Only.

Experimental data on the differential cross sections of the p+A implies p+X reaction on exp 6 Li, Be, C, Al, Cu and Ta nuclei for the proton emission at 70 deg, 90 deg, 118 deg, 137 deg and 160 deg in the l.s. are presented in tables and graphs. The measurements were performed at the highest available incident energy of 400 GeV. The data at 700 MeV are also given. The experimental procedure and instruments are described in detail. Significant dissimilarities in shapes of the spectra for different targets have been observed at all angles. The strong A-dependence of the proton yields changes but little as the incident proton energy increases from 8 to 400 GeV. The hypothesis of nuclear scaling, which, in particular, predicts that the spectra of backward emitted protons must depend weakly on the incident energy in the range from 8 to 400 GeV, has been reaffirmed. (Atomindex citation 11:507508)

Juel-1605 PC **A03**/MF **A01**
Cologne Univ. (Germany, F.R.).
Investigation of the Structure of the Double Magic Nucleus exp 132 SN.
Diss,
W. D. Lauppe. Jul 79, 42p
In German.
U.S. Sales Only.

The decay of a mu -isomer in the doubly magic nucleus exp 132 Sn sub 50 is investigated with the

fission product separator JOSEF at the nuclear research reactor FRJ 2 (DIDO) in the Kernforschungsanlage Juelich. The separation of exp 132 Sn from the fission product mixture of a thermal neutron irradiated exp 235 U target is performed with a gas-filled fission product separator. The unslowed fission products are separated within 1-2 mu s according to nuclear charge and mass. The short separation time allowed the investigation of isomeric states, populated directly in fission, with a half-life > 1 mu s. A gamma line of 4041 keV is assigned to the decay of an isomeric state in exp 132 Sn. The half-life of the isomeric state is determined by delayed fission product - gamma coincidences. Gamma - gamma coincidence measurements reveal the existence of four other gamma transitions, following the decay of the isomer. The evaluation of delayed gamma - gamma coincidences allows the determination of the life-time for another state. According to the measured data a level scheme of exp 132 Sn is established. The level scheme is discussed within the framework of the spherical shell model. For this purpose the experimental level scheme is compared with the results of RPA calculations performed with two sets of input parameters. The fairly good agreement between the experimental and theoretical values allows the proposal of the spins and parities of three excited states. (Atomindex citation 11:507567)

JAERI-M-8062 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Japanese List of Requests for Nuclear Data.
Sin-iti Igarasi. Jan 79, 38p
U.S. Sales Only.

Requests for nuclear data for fission reactors, fusion reactors and safeguards are presented. They are those screened by a WRENDA Group of the Japanese Nuclear Data Committee, and are contributed to WRENDA 79/80. This report contains 244 requests: 81 for fission reactors, 94 for fusion reactors and 69 for safeguards. New requests are 18 for fission reactors, 3 for fusion reactors and 1 for safeguards. (Atomindex citation 11:507553)

JINR-E-1-12117 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Investigation of Associative Multiplicity in the p Tilde p Implies p(Slow)+X Reaction at 22.4 GeV/C.
B. V. Batyunya, I. V. Boguslavsky, and I. M. Gramenitsky. 1979, 9p CONF-780826-
19. conference on high energy physics, Tokyo, Japan, 23 Aug 1978.
U.S. Sales Only.

The associative multiplicity <n(M/sub x/ exp 2)> as a function of the missing mass squared M/sub x/ to the identified proton in the p tilde p implies p(slow)+X reaction at 22.4 GeV/c is studied. A different behavior of the associative multiplicity for diffraction and nondiffraction events is observed. The M/sub X/ exp 2 dependence on the ratio <n(M/sub X/ exp 2)>/D is qualitatively explained on the basis of the two-component model, where D is the dispersion. An analog of KNO scaling in the system X is obtained for all values of M/sub X/ exp 2 with the help of the scaling variable. A similar behavior of the p tilde p implies p(slow)+X and pp implies p(slow)+X reactions is pointed out. (Atomindex citation 11:509841)

JINR-E-1-12296 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Nuclear Scattering of Deuterons at 4.3, 6.3 and 8.9 GeV/C.
L. S. Azhgirey, M. A. Ignatenko, and V. V. Ivanov. 1979, 29p
U.S. Sales Only.

The momentum spectra of secondary deuterons emitted at an angle of 103 mrad in the interactions of 4.3, 6.3 and 8.9 GeV/c deuterons with C, Al, Bi, exp 1 exp 2 H and exp 6 exp 7 Li nuclei have been measured. The experiments were carried out with the deuteron beam extracted from JINR synchrophasotron. The analysis of the results in the framework of the multiple nucleon-nucleon scattering model is given. The observed momentum spectra of deuterons from d-C collisions have been qualitatively described on the assumption that in relativistic deuteron collisions the processes are of importance in which nuclear nucleons involved in interactions with incident deuterons should be emitted in the bound state. (Atomindex citation 11:507502)

JINR-E-1-12393 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Quasifree Knockout of Proton Pairs in the C(p,3P) Reaction at 640 MeV.
V. I. Komarov, G. E. Kosarev, D. Netzband, H. Mueller, and T. Stiehler. 1979, 8p
U.S. Sales Only.

The mechanism of the p+C implies p+p+p+Be direct nuclear reaction at 640 MeV has been studied. Three energetic protons of the final state have been detected. The conditions of the experiment were chosen in accordance with the kinematics of the two-nucleon quasi-free knockout. Energy spectrum of backward emitted protons was measured in the triple coincidence experiment. The cross section of the backward emitted protons decreased monotonicly with increasing angles between the protons emitted forward. Phenomenological models assuming proton scattering on proton pairs are in qualitative agreement with experimental data. (Atomindex citation 11:507565)

JINR-E-1-12502 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Fermi Motion Corrections for Deep Inelastic Muon Scattering on Nuclei at Large Q exp 2.
I. A. Savin, and J. Zacek. 1979, 11p
U.S. Sales Only.

Fermi motion corrections for deep inelastic cross section on carbon nuclei at 300 GeV energy of primary muons have been calculated to obtain qualitative estimates in HA-4 experiment kinematic region. The calculations have been performed in the nonrelativistic approach using incoherent approximation. The ratios between structure functions of the nucleus and free nucleons have been found at Q exp 2 > 10(GeV/c) exp 2. The calculations indicate that the Fermi motion produces the average shift of about 20 percent in kinematic variables x and nu /sub mu / and corrections for the cross sections exceed 30 percent for the x > 0.7 region. Thus the interpretation of experimental data should include Fermi motion in nuclei. (Atomindex citation 11:507452)

JINR-E-15-12380 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Radiative Thermal Neutron Capture by Helium 3.
V. P. Alfimenkov, S. B. Borzakov, G. G. Bunatian, L. B. Pikelner, and E. I. Sharapov. 1979, 16p
U.S. Sales Only.

The results of exprimental and theoretical investigation of the radiative thermal neutron capture by exp 3 He are reported. The measurements were performed by the time-of-flight method at the pulsed reactor IBR-30 with the exp 3 He gaseous target and NaI(Tl) detector. The effective cross section of the (n, gamma) reaction followed by magnetic dipole radiation was calculated with the Gauss wave functions of the ground states of exp 3 He and exp 4 He. A comparison of experimental and theoretical results allowed an estimate of the admixture of the "mixed symmetry" state in the exp 4 He nucleus. (Atomindex citation 11:507487)

JINR-E-2-12014 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
P Odd Asymmetries in Deep-Inelastic Scattering of Polarized Leptons and Antileptons on Nucleons.
S. M. Bilenky. 1978, 15p
U.S. Sales Only.

P odd asymmetries in deep inelastic scattering of polarized leptons and antileptons on nucleons are considered. Relations between asymmetries based only on the assumption that the neutral current has V and A structure are obtained. In the framework of the Weinberg-Salam theory for the case of the isoscalar target some relations between asymmetries and other measurable quantities are derived by using only transformation properties of the hadronic neutral current. (Atomindex citation 11:507039)

JINR-E-2-12381 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Weak Nucleon-Nucleon Interactions in the Simplest Reactions. 1. Pt. State of the Problem. General Form of the Long-Range Parity-Violating Potential.
V. M. Dubovik, V. S. Zamiralov, and S. V. Zenkin. 1979, 29p
U.S. Sales Only.

Parity-violating pi , omega exchange potentials based on SU(4) currents of the Weinberg-Salam model are considered. The conventional parametrizations of weak potentials are revised and specified within SU(4) currents. The relative contributions of separable and nonseparable diagrams to the asymmetry parameter Asub(pp) in the reaction of p vector+p implies p+p and circular gamma - polarization Psub(gamma) in the reactions of n+p implies d+ gamma and n+d implies t+ gamma are evaluated within the different modifications of the factorization approach and various strong potentials. The absence of omega meson contribution to the separable part of the Psub(gamma) in the n+p implies d+ gamma reaction is regarded. Nonseparable contributions are also evaluated within the simple gauge model. (Atomindex citation 11:507067)

JINR-E-4-11946 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Coupled Channel Method for the pi exp -4 He Elastic and Inelastic Scattering.
M. Gmitro, and R. Mach. 1978, 15p
U.S. Sales Only.

Equations of the coupled channel method written in the momentum space are solved in the K-matrix approach, which allow to consider simultaneously the elastic and inelastic pion-nuclear reactions. The excitation mechanisms of exp 4 HE by the low energy (<100 MeV) pions is considered. Calculated total elastic and total inelastic cross sections are given for several outgoing channels of the reaction exp 4 He(pi exp - , pi exp -) exp 4 He. The single-charge-exchange reaction on exp 4 He is discussed. (Atomindex citation 11:495996)

JINR-R-1-11506 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Momentum Characteristics of the Interactions of pi exp - Mesons with Several Nucleons of a Carbon Nucleus.
N. Angelov, A. I. Anoshin, and N. O. Akhababyan. 1978, 9p CONF-780826-44
In Russian.19. conference on high energy physics, Tokyo, Japan, 23 Aug 1978.
U.S. Sales Only.

Inelastic interactions of pi exp - mesons at p=40 GeV/c with several protons of a carbon nucleus are singled out. Multiplicities of such events and pion inclusive spectra are obtained, which are compared with similar spectra of pion-proton interactions. Data on momentum characteristics of multinucleon interactions manifest the differences in pi exp + - and pi exp - -meson behavior in fragmentation regions of initial particles and in central region depending on the number of protons participating in the interaction. (Atomindex citation 11:507308)

JINR-R-1-11838 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Search for Charmed Particles in a Neutron Beam of the Serpukhov Accelerator.
G. Ajkhner, A. N. Aleev, and V. A. Aref'ev. 1978, 17p
In Russian.
U.S. Sales Only.

Search for charmed particles produced by neutrons on a carbon target was performed. Charmed meson and baryon resonances were investigated over the following channels of decay: D exp 0

(antiD exp 0) implies K exp +- pi exp +- , D exp +- implies K exp +- pi exp +- pi exp +- , F exp +- implies K exp +- K exp -+ pi exp +- , C exp + implies pK exp - pi exp + , C exp + implies p anti K exp 0 . The upper limits for partial cross sections of particle production have been determined. (Atomindex citation 11:509937)

JINR-R-1-12067 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Mechanism of Proton Emission into the Backward Hemisphere in Pion-Carbon Interactions at 5 GeV/C.
O. B. Abdinov, A. A. Bajramov, Yu. A. Budagov, Sh. Valkar, and A. M. Dvornik. 1979, 11p
In Russian.
U.S. Sales Only.

Experimental data on 11572 events of 5 GeV/c momenta pi exp - carbon interactions registered in the one-meter propane bubble chamber are analyzed. The protons with momenta $0.2<p<0.6$ GeV/c were chosen in the process of analysis. The momentum distributions of protons emitted into the backward hemisphere are compared with evaluations based on the cascade emission model. It is shown that the mechanism of nucleon rescattering in the nucleus, absorption of slow pions by a nucleon pair and disintegration of the residual excited nucleus describes satisfactorily the process of high-energy hadron-nucleus interaction with proton emission in the backward hemisphere up to 5 GeV. The available data allow one to single out some mechanisms choosing definite momentum and angle intervals. (Atomindex citation 11:507484)

JINR-R-1-12179 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Determination of Background Event Quantity at a Sufficiently Great Statistics.
A. Abdivaliev, C. Besliu, A. P. Gasparyan, S. Gruia, and A. P. Ierusalimov. 1979, 8p
In Russian.
U.S. Sales Only.

The procedure of determining background event quantity as applied to track chambers is described. To determine a background event, the selection of events over the chi exp 2 <C, C< <chi exp 2 confident condition is used, where chi exp 2 selects the process under study. The selected events are further developed at the assumption of a normal distribution of measurement errors. It is shown that at a sufficiently great statistics one could determine the background without using any models of the process investigated. (Atomindex citation 11:497291)

JINR-R-2-12066 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Nucleus-Nucleus Interactions at High Energies.
A. S. Pak, B. B. Uzhinskii, and Ch. Tsehrehn. 1979, 26p
In Russian.
U.S. Sales Only.

The bases of quantity theory of the simplest processes of nucleus-nucleus interaction at the medium and high energies are presented. Supposition on the factorization of density functions of the main states of the colliding nuclei is taken as the main approximation. The method of transition from amplitude to phase calculation is described. Elastic nucleus-nucleus scattering is considered and the Andreev series is obtained by the method of generating functions. (Atomindex citation 11:507436)

JINR-R-2-12205 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Inteference of Identical Particles Emitted by Sources of Different Sizes.
R. Lednitski, and M. I. Podgoretskii. 1979, 15p
In Russian.
U.S. Sales Only.

The interference of identical pi mesons is considered in the framework of the phenomenological description. The interference effect is observed in all cases, but sometimes its value appears to be notably less than the expected one. Some natural possibilities of interpreting this phenomenon are analyzed. In particular, it could occur if identical pi mesons are generated by sources of quite different sizes. Processes are also considered in which the interference effect appears for nonidentical pi mesons as well. (Atomindex citation 11:507144)

JINR-R-2-12518 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Pi -Meson Spectrum in Nuclear Matter at High Density and Temperature.
G. G. Bunatyan. 1979, 22p
In Russian.
U.S. Sales Only.

The expressions for pi -meson operator in nuclear matter consisting of interacting nucleons, delta sub 33 isobars and pi mesons at high temperature T and density rho are obtained. The presence of interacting pi mesons in balance with heated matter in medium at high T is taken into account. The singularities of the temperature pi -meson. Green function, determining pi meson spectrum at various T, are investigated. The dependence of the critical density rho/sub k/(T) on T is obtained, and the conditions of the pi -condensate instability, appearing at high density rho and temperature T, arising in heavy nuclear collisions are investigated. (Atomindex citation 11:507339)

JINR-R-3-12404 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Experimental Study of Resonance Self-Shielding Effects for Total and Fission Cross-Sections of Plutonium-239.
T. Bakalov, G. Ilchev, S. Toshkov, 1979, 12p
In Russian.
U.S. Sales Only.

By experimental measurement of the neutron transmission functions through metallic samples of plutonium-239 with the thickness from 0.86 to 49 g/cm exp 2 and time-of-flight spectrometers at the pulsed fast reactor IBR-30, the resonance self-shielding effects for total neutron cross-section and fission cross-section of plutonium-239 in the energy range form 21.5 to 4.65x10 exp -3 keV have been obtained. Time-of-flight neutron spectra have been determined with the help of batteries of proportional exp 3 He-counters and a fast-working ionization fission chamber with 22 layers of plutonium-239 and total mass of 0.5 g. The treatment of measured transmission functions has been carried out with the help of the least-square method (LSM) and the statistical method using a priori information (Bayesian approach). The second method leads to the better stability of the results and to essentially smaller time of calculation on the computer as compared with the LSM. (Atomindex citation 11:507503)

JINR-R-4-11969 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Qualitative Characteristics of High Spin State Structure in Odd Nuclei.
A. Akbarov, B. Choriev, I. N. Mikhailov, and R. Kh. Safarov. 1978, 19p
In Russian.
U.S. Sales Only.

The questions of structure and properties of high spin states in odd nuclei are discussed. The qualitative analytic evaluations of electromagnetic transition probabilities are compared with the results of numerical calculations for the /sup 159, 161/Dy isotopes, which are made in the framework of semimicroscopic model of an odd nucleus taking into account mixing of states with different K, where K is projection of the angular momentum upon the nucleus inner axis. Variations of moments of inertia, determined phenomenologically, are compared with the results calculated according to microscopic model of odd nuclei. (Atomindex citation 11:507304)

JINR-R-4-12398 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Shape of Fast Rotating Heated Nuclei. (Model).
A. V. Ignatyuk, I. N. Mikhailov, Kh. L. Molina, R. G. Nazmitdinov, and K. Pomorski. 1979, 15p
In Russian.
U.S. Sales Only.

The model is formulated for studying the shape of fast rotating heated nuclei. Within the model the macroscopic effects (liquid drop) and the microscopic effects (shell correction) are taken into account in a standard way. The systematic calculations of the thermodynamic potentials (the Gibbs-Routhian function, the Gibbs function, the energy) have been performed for the rare earth nuclei with $60 <= Z <= 76$, $90 <= N <= 108$ in the interval of the frequency of rotation $0 <= \omega <= 1$ MeV and of the temperature $0 <= t <= 2$ MeV. The results are in a good agreement with the earlier investigations which had been done for the extreme cases of cold and of very hot ($t >$ or approximately 2 MeV) nuclei. (Atomindex citation 11:507386)

JINR-R-4-12490 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Some Problems of a Semimicroscopic Description of a Giant M1-Resonance and M1-Transitions in Deformed Nuclei.
V. O. Nesterenko. 1979, 19p
In Russian.
U.S. Sales Only.

Within the random phase approximation the calculations of a dipole giant magnetic resonance (DGMR) for a series of nuclei of rare-earth and transuranium regions are presented. It is shown that a considerable splitting (broadening) of DGMR is possible, in which a low energy part of DGMR is formed due mainly to proton states, whereas a high energy part is due to neutron ones. The localization region of DGMR is as high as 5-7 MeV. Reduced widths k/sub M1/ and width ratio anti GITA-bar/sub E1//GITA-bar/sub M1/ at the neutron binding energy B/sub n/ are calculated and compared with experiment. (Atomindex citation 11:507429)

JINR-R-6-12403 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Study on the exp 147 Eu and exp 155 Dy Positron Decays.
A. V. Budzyak, V. V. Kuznetsov, N. A. Lebedev, G. I. Lizurei, and Yu. V. Yushkevich. 1979, 11p
In Russian.
U.S. Sales Only.

Positron decay of exp 147 Eu and exp 155 Dy has been investigated. Experiments were carried out by means of a nonferrous beta spectrometer with a toroidal magnetic field. Fermi-Curie diagrams for exp 147 Eu and exp 155 Dy positrons are presented. A positron spectrum of decaying exp 155 Dy consists of three components; a positron spectrum of decaying exp 155 Dy consists of four components. Given are data on treating experimental spectra: boundary energy and relative intensities of positron components. Ratios of exp 147 Eu positron components intensities and intensity of K conversion transition electron of 197 keV turned out to be equal to 4.80(25)x10 exp -2 , 2.60(40)x10 exp -2 and 1.95(30)x10 exp -2 , but the mass difference (exp 155 Dy- exp 155 Tb) was 2094(2) keV. Fragments of decay diagrams for exp 147 Eu implies exp 147 Sm and exp 155 Dy implies exp 155 Tb are given as well. (Atomindex citation 11:507525)

JINR-R-7-12092 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Description of Angular Distributions of Neutrons Produced in Heavy Ion Reactions.
S. A. Karamyan. 1979, 20p
In Russian.
U.S. Sales Only.

The analysis of experimental data on angular distributions of neutrons from heavy ion reactions on intermediate mass and heavy nuclei has been carried out. The interactions of the exp 12 C and exp 22 Ne ions with Ge, Mo, Ag, exp 141 Pr nuclei and exp 16 O and exp 40 Ar ion interaction have been studied. The fission of exp 197 Au, exp 209 Bi, exp

238 U nuclei under the action of exp 12 C, exp 16 O, exp 22 Ne ions and also fission of exp 197 Au, exp 209 Bi nuclei under the action of exp 40 Ar ions has been investigated. Satisfactory agreement of experimental neutron anisotropy with the calculated values of the theory of compound nucleus neutron angular distribution at definite choice of temperature parameters has been obtained for weak fissile nuclei. The comparison of experimental and calculation results for strong fissile nuclei shows that neutrons are emitted by perfectly accelerated fragments. Part of the anisotropy in this case is explained by the kinematic reflection of the fission fragment anisotropy, and part, by self-anisotropy of neutrons connected with angular momentum of emitting fission fragments. (Atomindex citation 11:507395)

JINR-R-7-12368 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Data Interpretation on gamma Ray Multiplicity in Deep Inelastic Reactions.
S. A. Karamyan. 1979, 13p
In Russian.
U.S. Sales Only.

The analysis of characteristic results of experiments on measuring the gamma -ray multiplicity M/sub gamma / in deep inelastic reactions, induced by heavy ions, is performed. On the basis of experimental dependences M/sub gamma / on an exit angle, kinetic energy and atomic number of product, the partial angular momenta of different forms of the regular rotational motion are estimated for the double nuclear system. In order to explain M/sub gamma / values related to low-energy part of the product spectrum, an assumption was made that a valuable contribution of the angular momentum, transferred to reaction products as a result of the system breaking, additionally to a momentum connected with the regular rotational motion, was present for the case of a strongly deformed system. (Atomindex citation 11:507394)

JINR-1-12347 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Estimate of Yields of Singly Charged Fragments with Respect to Yields of Protons in the p exp 12 C, D exp 12 C alpha exp 12 C Reactions.
S. G. Arakelyan, and B. A. Shakhbazyan. 1979, 16p
In Russian.
U.S. Sales Only.

The fragmentation of carbon nuclei in the irradiation of the propane chamber with relativistic protons, deuterons and alpha -particles is considered. On the basis of experimental data yields of secondary deuterons, tritons and other fragments were estimated with respect to secondary proton production in p exp 12 C, d exp 12 C, alpha exp 12 C reactions. These ratios depend on track length. (Atomindex citation 11:507497)

JINR-13-12333 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
On-Line Measurement of Polarization of the Polarized Proton Target.
M. Yu. Liburg, V. N. Matafonov, K. Ondreicka, and J. Strachota. 1979, 13p
In Russian.
U.S. Sales Only.

The NMR signal obtained by the Q-meter technique is digitized as well as the baseline. The digitization is controlled by the HP 2116c on-line computer which stores the data on a magnetic type. To improve the signal/noise ratio in the measurement of the thermal equilibrium signal, a number of consecutive signals may be used for a detailed analysis eliminating the Q-meter nonlinearity effects. The experimental arrangement is described. It is shown that such a use of the computer improves the accuracy of the polarization measurement in comparison with analogous methods. (Atomindex citation 11:509254)

JINR-4-11262 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Fragmentation Model and Multinucleon Transfer Reactions.
V. V. Avdeichikov. 1978, 17p
In Russian.
U.S. Sales Only.

To describe fragmentation process characteristics in the course of interaction of high energy ions with heavy nuclei and reactions of multinucleon transfers a model of non-equilibrium quasi-two-particle decay is used. The process of heavy charged fragment formation in the reactions of multinucleon transfers at initial ion energies of approximately 10 MeV/nucleon is considered. On the basis of the Q/sub gg/-t sub 3 -systematics the problem of nuclear stability of exp 10 He is analyzed. Possibility of description of nucleus fission process in the framework of quasi-two-particle decay and the Q/sub gg/-t sub 3 - systematics is demonstrated, with calculation of mass distributions of uranium fission products as an example. (Atomindex citation 11:507310)

KFKI-1979-64 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Two-Potential Formula and the Integral Form of the Distorted Faddeev Equations.
Gy. Bencze, and E. F. Redish. Oct 79, 7p
U.S. Sales Only.

The authors demonstrate that a rigorous two-potential formula combined with a standard distribution approach to deriving coupled integral equations leads to an integral form of the Distorted Faddeev equations for the three-body scattering problem. (Atomindex citation 11:507322)

KFKI-1979-76 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
New Effects in the Massive Thirring Model Repulsive Case.
V. E. Korepin. Nov 79, 19p
U.S. Sales Only.

The repulsive case of the quantum version of the massive Thirring model is considered. It is shown that there is alpha rich particle spectrum in the theory. The S matrix of fermions proves to be a discontinuous function of the coupling constant. These effects are the result of the qualitative change of the physical vacuum in the limit of the strong repulsion g implies - pi . (Atomindex citation 11:509375)

KFTI-78-26 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Theory of P-Invariance Breaking in gamma N Implies N pi Processes and Dispersion Relations.
Yu. V. Kulish. 1978, 20p
In Russian.
U.S. Sales Only.

On the basis of dispersion relations for invariant amplitudes with definite properties in relation to the crossing-transformation, in the approximation of the absence of the CP invariance breaking effect, the dispersion relations are obtained for P-odd multipole amplitudes of pion photoproduction on nucleons. It is shown that in such an approximation the Born part of gamma N implies N pi exp 0 amplitudes turns into zero. The consequences of the resonance model are considered, where real parts of all P-odd multipole amplitudes generate by imaginary parts of amplitudes corresponding to the delta (1236) resonance excitation. The quark model consequences with the exchange of neutral vector meson for P-odd amplitudes of pi exp 0 - meson photoproduction on nucleons are studied. (Atomindex citation 11:509888)

KFTI-78-31 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Inelastic Diffractive Scattering of Intermediate Energy Particles by Atomic Nuclei.
Yu. A. Berezhnoi, and G. . . Khomenko. 1978, 13p
In Russian.
U.S. Sales Only.

On the basis of the diffraction model there are calculated, in the analytical form, the differential cross section and the polarization of spin 1/2 particles in inelastic scattering with the excitation of single-phonon states in the target nuclei. The angular distribution of polarization is analyzed. The effect of Coulomb interaction on the polarization value in inelastic scattering is investigated. It is shown that the polarization in inelastic scattering is similar qualitatively to that in elastic scattering. The results of the calculations of the cross section and polarization of the 185 MeV energy protons inelasticly scattered by lead nuclei with the excitation of the first octapole level agree with the experimental data. (Atomindex citation 11:507325)

KFTI-79-13 PC **A03**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Neutrino Deuteron Scattering and the Virtual Nucleon Density Matrix.
M. P. Rekalo, G. I. Gakh, and A. P. Rekalo. 1979, 29p
U.S. Sales Only.

The formalism of the virtual nucleon density matrix has been suggested for the relativistic description of the inelastic scattering on the deuteron a + d implies b + N sub 1 + N sub 2 . The efficiency of the suggested formalism is demonstrated for the case of the deuteron disintegration anti nu + d implies mu exp + + n + n. In the calculation of the observable characteristics of this reaction the relativistically invariant expression for the npd vertex is used. The corrections connected with the nucleon binding energy in the deuteron and such relativistic effects as the contribution of the antinucleons in the intermediate state are taken into account. The differential cross section of the anti nu + d implies mu exp + + n + n reaction has been calculated for the following experimental conditions: only muon is detected in the final state, muon and one of the neutrons are detected in the final state. The limit of the zero deuteron binding has been investigated. (Atomindex citation 11:507179)

KFTI-79-19 PC **A03**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Elastic Electron-Deuteron Scattering in Vectorlike Theories.
G. I. Gakh, 1979, 31p
U.S. Sales Only.

The P odd effects caused by neutral weak currents in the elastic electron-deuteron scattering have been investigated in the vectorlike theories. Cross sections for scattering of both nonpolarized and longitudinally polarized electrons by the deuterons which have both vector and tensor polarizations have been calculated. The general case of the P invariance violation in the elastic electron-deuteron scattering amplitude is considered. The P invariance is violated both in the lepton and the hadron vertices. The vectorlike theory is a particular case when the P invariance is violated only in the hadron vertex. (Atomindex citation 11:507089)

KFTI-79-9 PC **A03**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Lepton Quantum Number Violating Processes.
G. I. Gakh. 1979, 35p
U.S. Sales Only.

Several processes violating muon lepton number (mu implies e gamma gamma , mu e implies gamma gamma , gamma e implies gamma mu , ez implies mu exp - gamma z, gamma z implies mu exp + ez), (where z denotes nucleon or nucleus) have been considered in the pole model framework. Electron and photon energies Dalitz plot as well as final-state electron and photon energy e gamma gamma decay. The distribution on the scattering angle of two photons is calculated. The total probability for the decay has been estimated. For the reactions gamma e implies gamma mu , mu e implies gamma gamma differential and total cross sections have been obtained with account for the electron mass. The distributions d exp 2 = /dq exp 2 dw exp 2 , where q exp 2 is the nuclear four momentum transfer squared, W exp 2 is the square of the total energy of the produced mu e-pair (or mu gamma -system) have been obtained for the ez implies mu exp - gamma z, gamma z implies mu exp + ez reactions. (Atomindex citation 11:507088)

KIYI-78-10 PC **A03**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Yadernykh Issledovanii.
Evaluated Neutron Cross Sections and Resonance Integrals of the Fission Products with Z=38-43.
Zh. I. Pisanko, and A. F. Fedorova. 1978, 31p
In Russian.
U.S. Sales Only.

Evaluated are the neutron cross sections and resonance integrals for elements with Z=38-43 (Sr, Y, Zr, Nb, Mo, Tc). The recommended neutron cross sections at Vsub(n)=2200 m/s neutron velocity and resonance integrals for given isotopes are presented. (Atomindex citation 11:496028)

KMU-HEP-7811 PC **A02**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Quark-Recombination Model and Correlations Between Hard and Soft Hadronic Processes.
J. Ranft. Jul 78, 6p CONF-780788-6
International symposium on high energy multiparticle dynamics, Tabor, Czechoslovakia, 2 Jul 1978.
U.S. Sales Only.

Proceeding from the fact that quark and gluon recombination models make definite predictions for correlations between hard and soft processes, the author briefly discusses the following experiments: (i) correlations between deep inelastic antineutrino-proton scattering and particle production in the proton fragmentation region, (ii) correlations between massive lepton pairs and particles produced in the fragmentation regions, and (iii) correlations between large transverse momentum particles and leading protons. In order to present the large transverse momentum - leading proton correlation, a divided correlation function similar to that used for studying short-range correlations of low-transverse-momentum particles is defined. (Atomindex citation 11:509905)

KMU-HEP-7812 PC **A02**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Universality of Mass Singularities Beyond Leading Logarithm Approximation.
J. Kripfganz. Aug 78, 19p
U.S. Sales Only.

Lepton pair production is studied in low-order QCD perturbation theory. Mass singularities are analyzed. Also non-leading logarithms are found to factorize. This factorization allows the consistent computation of correction terms to the Drell-Yan formula. The same factorization properties remain true in case of polarized initial-state hadrons and final-state leptons. Working in Coulomb gauge greatly simplifies the calculations. (Atomindex citation 11:509886)

KMU-HEP-7815 PC **A02**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Jet Analysis in Lepton-Hadron Scattering from QCD.
J. Ranft, and G. Ranft. Oct 78, 13p
U.S. Sales Only.

For deep inelastic lepton-hadron scattering the cross sections dsigma/dT and dsigma/dS are deduced from QCD perturbation theory in terms of the collective jet variables thrust T and spherocity S. It is found that the shape of these cross sections depends mainly on the total hadronic energy W. While present data are consistent with the cross sections calculated, they do not yet prove or disprove the presence of three-jet contributions. It is predicted that these contributions will be clearly visible for W greater than approximately 12 to 15 GeV. (Atomindex citation 11:509906)

KMU-HEP-7902 PC **A03**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Particle Production in Soft and Hard Hadronic Collisions. Is There Evidence for Hadronic Constituents.
J Ranft. Jan 79, 34p
U.S. Sales Only.

After a short review of some properties of hadronic multi-particle systems which show the presence of a statistical mechanism, particle production is described in soft hadronic collisions using the quark recombination model. Finally, particle production in hard collisions, in particular large transverse momentum processes and the occurrence of gluon jets in deep inelastic processes, is discussed within the framework of QCD perturbation theory. (Atomindex citation 11:509907)

KMU-HEP-7903 PC **A02**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Sum Rules for Meson and Baryon Production in the Quark Recombination Model.
J. Ranft. Jan 79, 21p
U.S. Sales Only.

A quark recombination model with quark distributions according to a generalized Kuti-Weisskopf model is used. Mesons are formed by v-s (valence-sea) and s-s recombination, baryons by vvv, vvs, vss and sss recombination. Sum rules for energy momentum conservation, baryon number, valence and sea quarks are shown to constrain the recombination parameters of the model significantly. The resulting model is consistent with experimental data. (Atomindex citation 11:509908)

KMU-HEP-7909 PC **A04**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Simulation of Quark Jet Fragmentation into Mesons and Baryons on the Basis of a Chain Decay Model.
S. Ritter, and J. Ranft. Jul 79, 51p
U.S. Sales Only.

A Monte Carlo calculation is presented for multiparticle events in e exp + e exp - annihilation. The underlying model is a chain decay model and has the following features: (i) baryon production as well as meson production, (ii) Energy-momentum conservation, (iii) conservation of quantum numbers like Q, I sub 3 , S, B, (iv) inclusion of transverse momentum of the emitted hadrons, and (v) fragmentation via meson and baryon resonances of the lowest SU(3) multiplets. The results of the model are compared with experimental data on e exp + e exp - annihilation including average multiplicities of charged and neutral particles, longitudinal and transverse momentum distributions of the final hadrons and distributions of jet variables like thrust. In general the agreement of the model with experimental data is good. (Atomindex citation 11:509911)

LA-UR-80-1709 PC **A02**/MF **A01**
Texas A and M Univ., College Station.
Measurement of K/sub NN/ and K/sub LL/ in p Vector p Implies N Vector X at 800 MeV.
T. S. Bhatia, G. Glass, and J. C. Hiebert. 1980, 4p CONF-800824-1
Contract W-7405-ENG-36
International symposium on polarization phenomena in nuclear physics, Santa Fe, NM, USA, 11 Aug 1980.

The spin transfer parameters, K/sub NN/ and K/sub LL/ have been measured in p vector p implies n vector X at 0 exp 0 and 800 MeV for neutron momenta between 700 and 1200 MeV/c. Peak values of K/sub NN/ and K/sub LL/ are -.3 +- .05 and -.5 +- .1, respectively. (ERA citation 05:029786)

LA-UR-80-1710 PC **A02**/MF **A01**
Texas A and M Univ., College Station.
Polarized Neutron Beam at LAMPF.
T. S. Bhatia, G. Glass, and J. C. Hiebert. 1980, 4p CONF-800824-2
Contract W-7405-ENG-36
International symposium on polarization phenomena in nuclear physics, Santa Fe, NM, USA, 11 Aug 1980.

The polarization of neutrons produced from the reaction pd implies anti n was measured at a laboratory angle of 20 exp 0 at an incident proton kinetic energy of 800 MeV. For the highest energy neutron peak at approx. 665 MeV, as well as for the broad pion production peak at approx. 325 MeV, the neutron polarization has been found to be approx. 0.20. The measured polarization for the quasielastic process has been found to be in good agreement with the free np analyzing power measurements. Such a polarized neutron beam, having a broad spectrum of momenta from 800 to 1300 MeV/c has been used at LAMPF for free np spin correlation measurements. (ERA citation 05:029807)

LA-UR-80-1733 PC **A02**/MF **A01**
Manitoba Univ., Winnipeg. Dept. of Physics.
Analyzing Powers of exp 3 He(P Vector,p) exp 3 He Elastic Scattering Between 30 and 50 MeV.
J. Birchall, W. T. H. van Oers, H. E. Conzett, P. von Rossen, and R. M. Larimer. 1980, 4p CONF-800824-5
Contract W-7405-ENG-36
International symposium on polarization phenomena in nuclear physics, Santa Fe, NM, USA, 11 Aug 1980.

Analyzing power data have been obtained for exp 3 He(p vector,p) exp 3 He elastic scattering at seven energies between 30 and 50 MeV at laboratory angles between 20 exp 0 and 160 exp 0. Errors are typically less than 0.01. These results supplement earlier differential and total reaction cross-section and analyzing power data and new data obtained with a polarized exp 3 He target. (ERA citation 05:029808)

LA-UR-80-1778 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Note on the Decays pi exp 0 Implies nu nu '.
P. Herczeg, and C. M. Hoffman. 1980, 11p
CONF-800724-1
Contract W-7405-ENG-36
20. international conference on high energy physics, Madison, WI, USA, 17 Jul 1980.

Phenomenological aspects of pi exp 0 implies nu nu ' are considered. From the existing experimental information, an upper limit GAMMA(pi exp 0 implies nu nu ')/GAMMA(pi exp 0 implies all) < 2.4 x 10 exp -5 (90% C.L.) is deduced. Possible mechanisms which can give rise to this process are discussed. Branching ratios of the order of 10 exp -7 for decays into the known neutrinos (nu / sub e/, nu /sub mu /) are found possible. Rates comparable to the experimental limit for decays into final states involving additional neutrinos (massive or massless) cannot be ruled out.). (ERA citation 05:031280)

LA-8377-T PC **A07**/MF **A01**
Los Alamos Scientific Lab., NM.
Measurement of the Doubly Differential Cross Section for pi exp - p Implies pi exp + pi exp - N Near Threshold.
J. B. Walter. May 80, 131p
Contracts W-7405-ENG-36, AS02-76ER021
Thesis.

The doubly differential cross sections for the pi exp + from the reaction pi exp - p implies pi exp + pi exp - n were measured at about twenty points for each of five energies between 245 MeV and 356 MeV. The experiment was carried out at the Clinton P. Anderson Meson Physics Facility, where a double focusing magnetic spectrometer detected the pi exp + mesons produced in a liquid hydrogen target. The measurements were normalized by comparison with pi exp - p elastic scattering measured with the same apparatus. These are the first such measurements in this energy range, and have an accuracy between 4.7% and 39%. The integrated reaction cross section was determined at each energy with an accuracy of about 5%. These agree with but are an improvement over previous measurements in this energy range. Comparison of the extrapolated threshold value of the mean square modulus of the matrix element with the soft pion calculations favors the symmetry breaking mechanism of Weinberg (xi = 0). It also demonstrates the futility of attempting to determine the symmetry breaking parameter xi from a single measurement of the integrated reaction cross section. (ERA citation 05:031274)

LAL-1294 PC **A16**/MF **A01**
Paris-11 Univ., Orsay (France). Lab. de l'Accelerateur Lineaire.
Study of the Pion Electromagnetic Form Factor in the Timelike Region, from the Production Threshold to 900 MeV in the Center of Mass.
A. Quenzer. 1977, 352p

in French. Thesis.
U.S. Sales Only.

The pion form factor is measured in the reaction e exp + e exp - implies pi exp + pi exp - for center of mass energies in the range 480-900 MeV. The results are first analyzed in terms of the conventional Vector Meson Dominance formalism, and then with the omega pi inelastic channel taken into account. The results of this latter formalism is a pion form factor (F) which fits quite well all the existing data on F in both the timelike and spacelike regions, and a pion mean square radius. (Atomindex citation 11:507177)

LBL-10924 PC **A02/MF A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Review of D and B Meson Decays.
M. S. Chanowitz. Jun 80, 20p CONF-800588-1
Contract W-7405-ENG-48
International symposium on high energy e+e- interactions, Nashville, TN, USA, 1 May 1980.

The theoretical picture of K and D decays is reviewed in order to explain why large enhancements are not expected in D decays. This expectation is contrasted with the available data on lifetimes and semileptonic branching ratios, which hint at large enhancements but are still ambiguous. Some of the theoretical ideas proposed to explain the enhancement of D exp 0 , and possibly F exp + nonleptonic decays are discussed. One of these, together with data presented earlier, suggests a way to detect the F exp + and a possible gluonium state in one fell swoop. New data on D implies rhoK/ pi K have implications for models which predict large nonleptonic enhancements from decays into exclusive final states. These are discussed. (ERA citation 05:029795)

LYCEN-7801 PC **A05/MF A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
1977 Annual Report.
82p
In French.
U.S. Sales Only.

The research areas of the LYON Nuclear Physics Institute are the following: in theoretical physics, nuclear structure, particle physics, nuclear reactions, elastic scattering; in nuclear experimental physics, nuclear reactions, intermediate and high energy physics, nuclear spectroscopy, perinuclear physics and chemistry. Instrumentation and technical operations are described. (Atomindex citation 11:496018)

NFL-1 PC **A05/MF A01**
Forskningsraadens Lab., Studsvik (Sweden).
Studsvik Science Research Laboratory. Progress Report 1977.
1978, 78p
U.S. Sales Only.

The research activities during 1977 are reported. The research programme includes neutron physics, neutron absorption and scattering, radiation chemistry and photochemistry, radiation damage, radioactivity, and theory. (Atomindex citation 10:438446)

N80-30162/5 PC **A03/MF a01**
Xavier Univ. of Louisiana, New Orleans.
The Multistate Impact Parameter Method for Molecular Charge Exchange in Nitrogen.
Final Report.
J. W. Ioup. Aug 80, 33p NASA-CR-3307
Grant NSG-1361

The multistate impact parameter method is applied to the calculation of total cross sections for low energy change transfer between nitrogen ions and nitrogen molecules. Experimental data showing the relationships between total cross section and ion energy for various pressures and electron ionization energies were obtained. Calculated and experimental cross section values from the work are compared with the experimental and theoretical results of other investigators.

OULNS-78-2 PC **A05/MF A01**
Osaka Univ.; Toyonaka (Japan). Lab. of Nuclear Studies.
Annual Report of Laboratory of Nuclear Studies, Osaka University. January 1977--December 1977.
1978, 96p
U.S. Sales Only.

Activities of the OULNS in 1977 are described in individual summaries: Cyclotron Division, High Voltage Accelerator Division, Mass Spectroscopy Division, Radiochemistry Division, Theoretical division. Publications in journals, etc., during the period are also given with abstracts. (Atomindex citation 10:427594)

REU-ITP-390 PC **A03/MF A01**
Eotvos Lorand Univ., Budapest (Hungary). Elmeleti Fizikai Intezet.
O(3) Symmetric Merons in SU(N) Gauge Theory.
Z. Horvath, and L. Palla. 1979, 31p
U.S. Sales Only.

Non-reducible O(3) symmetric meron solutions to classical SU(N+1) Yang-Mills theory in four dimensional Euclidean space are investigated. For even N the solutions have topological charge densities equal to a sum of delta-functions with integer coefficients while for odd N (N > 1) these coefficients can be both integer and half-integer. In all cases they correspond to solutions of a system of N coupled singular elliptic equations. The existence of two meron solutions of this system is discussed, and for N=3,4 some numerical solutions are given. (Atomindex citation 11:507113)

RI-92 PC **A02/MF A01**
Radievyi Inst., Leningrad (USSR).
Search for Collective Effects in Inelastic and Deep Inelastic Interactions of Relativistic Deuterons and alpha -Particles with Ag and Br Nuclei.
V. G. Bogdanov, N. A. Perfilov, V. A. Plyushchev, and Z. I. Solov'eva. 1978, 10p
In Russian.
U.S. Sales Only.

Disintegrations of Ag and Br nuclei of various multiplicities induced by 4.5 GeV/c per nucleon deuterons and alpha-particles were studied by means of the nuclear photoemulsion method. All secondaries were divided into four groups according to their energy, and angular distributions for these groups were obtained. Irregularities higher than statistical fluctuations were not observed. It is shown that the partial ratio of high-energy particles increases with the projectile mass. (Atomindex citation 11:507518)

RL-79-071 PC **A03/MF A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Anti-K Interactions Below 1 GeV/c.
G. P. Gopal. Sep 79, 36p
U.S. Sales Only.

This review examines the Y* states below 1900 MeV claimed by different Anti-KN partial wave analyses and total X-section and production experiments. Classification of these states in the context of SU(6) X 0(3) quark models is discussed and the problems are highlighted. Recently published data in Anti-KN induced channels is reviewed and some experimental discrepancies are pointed out. New experiments to help determine the partial wave amplitudes with greater certainty are suggested for the Anti-KN, pi lambda and pi sigma channels. (Atomindex citation 11:509871)

RL-79-073 PC **A03/MF A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Deep Inelastic Scattering and Asymptotic Freedom: A Detailed Analysis and Confrontation.
D. W. Duke, and R. G. Roberts. Oct 79, 43p
U.S. Sales Only.

A detailed calculation of the moments of electron, muon and neutrino deep inelastic scattering data has been performed. The Q exp 2 dependence of the moments has been analyzed in the context of asymptotic freedom. Also, in an alternative approach, the Q exp 2 dependence of the data has been analyzed at fixed x. In general very good agreement has been found between all the various data and the predictions of asymptotic freedom, at least for Q exp 2 > 2 GeV exp 2 , with the possible exception of the flavor singlet electron moments at Q exp 2 > 10 GeV exp 2 and n > 3. (Atomindex citation 11:509857)

RL-79-078 PC **A02/MF A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Measurement of Polarization in K exp - p Elastic Scattering Between 0.955 GeV/C and 1.272 GeV/C.
H. C. Bryant, A. A. Carter, and M. Coupland. Nov 79, 20p
U.S. Sales Only.

The polarization parameter has been measured for K exp - p elastic scattering at nine incident beam momenta between 0.955 GeV/c and 1.272 GeV/c covering the centre of mass angular range -0.9 <costheta* <+0.9. Experimental results and coefficients of Legendre polynomial fits to the data are presented and compared with other measurements and a partial wave analysis. (Atomindex citation 11:509957)

RL-79-081 PC **A02/MF A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Polarisation Effects in Inelastic Neutron Scattering.
S. W. Lovesey. Oct 79, 5p CONF-790930-2
Conference on polarized neutron in condensed matter research, Zaborow, Poland, 10 Sep 1979.
U.S. Sales Only.

Some of the possible uses of polarisation analysis in inelastic neutron scattering experiments are reviewed with emphasis on the theory rather than on techniques. Fundamental issues, nuclear and magnetic scattering are considered. (Atomindex citation 11:509894)

SLAC-PUB-2484 PC **A04/MF A01**
Stanford Linear Accelerator Center, CA.
1/N.
S. Coleman. Mar 80, 72p
Contract AC03-76SF00515

There exist families of field theories with symmetry group SO(N) (or SU(N)) that become simpler as N becomes larger. More precisely, the solutions to these theories possess an expansion in powers of 1/N. This expansion is the subject of these lectures. The 1/N expansion can be used to analyze model field theories. The 1/N expansion is developed for phi exp 4 theory and applied to two two-dimensional models with similar combinatoric structures, the Gross-Neveu model and the CP/ sup N-1/ model. These models display (in the leading 1/N approximation) such interesting phenomena as asymptotic freedom, dynamical symmetry breaking, dimensional transmutation, and non-perturbative confinement. It is possible that the 1/N expansion, with N the number of colors, might fruitfully be applied to quantum chromodynamics. Unfortunately, it is not possible to make a decisive test of the approximation, because no one knows how to compute even the first term in the expansion in closed form. However, it is possible to argue that this first term, whatever its detailed form, has many properties that are also shared by the real world, and which are otherwise underived from field theory. These include the saturation of scattering amplitudes by an infinite number of narrow resonances, the essential feature of dual-resonance models. (ERA citation 05:029804)

SLAC-Trans-0191 PC **A02/MF A01**
Akademiya Nauk SSSR, Moscow. Fizicheskii Inst.
Mass Formula for Mesons and Baryons.
A. D. Sakharov. May 80, 13p
Contract AC03-76SF00515
D.

The number of independent parameters in the semiempirical formula suggested by Ya.B. Zel'dovich and the author is reduced by using chromodynamic considerations. The consequences are compared with experiments. A list of new predictions is given. (ERA citation 05:031286)

TLU-66-79 PC **A03/MF A01**
Tandemacceleratorlaboratoriet, Uppsala (Sweden).

Direct - Semidirect and Compound Contributions to Radiative Neutron Capture Cross Sections.
I. Bergqvist, M. Ahmad, M. Anwar, A. Lindholm, and L. Nilsson. 1979, 31p
U.S. Sales Only.

Gamma-ray spectra from radiative capture of neutrons in exp 40 Ca, exp 58 Ni, exp 89 gamma and exp 206 Pb have been recorded at neutron energies between 2.5 and 11 MeV. The gamma radiation was detected by a large Na1(T1) scintillation detector using time-of-flight techniques to suppress background radiation. Cross sections for capture to bound final states, mainly ground states, were determined. Measured cross sections and data from previous experiments, are compared with predictions of the direct-semidirect (DSD) and compound-nucleus (CN) models. For neutron energies below 4 MeV the CN model accounts reasonably well for the observed cross sections. Above 7 MeV the DSD model gives good description of experimental data. In the energy region from 4 to 7 MeV the contributions from the two models are of the same order of magnitude and interference between the two capture processes might be important. (Atomindex citation 11:510096)

TRITA-EPP-79-13 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden).
Self-Confinement of Electromagnetic Radiation.
B. Lehnert. Jul 79, 20p
U.S. Sales Only.

A theoretical approach is outlined which attempts to explain elementary particles with a rest mass as eigenmodes of self-confined electromagnetic radiation. For this purpose an extended interpretation of Maxwell's equations is being suggested. The theory is illustrated by a simple special case where the particle interior contains a unipolar-like electric field having a non-vanishing divergence and coupled to a poloidal dipole-like magnetic field having a non-vanishing curl. At large distances from the particle center these fields approach their classical vacuum solutions. Numerical order-of-magnitude estimations based on this model are at least consistent with the experimental data of the electron and the proton. (Atomindex citation 11:509376)

USIP-79-10 PC **A03**/MF **A01**
Stockholm Univ. (Sweden). Institutionen foer Teoretisk Fysik.
Twistors, the Metastructure of Particles and Space-Time. An Introduction.
A. Bettle. Jun 79, 37p
U.S. Sales Only.

The aim of this paper is to review some basic facts about Penrose's twistor theory. The approach to the subject differs slightly from the usual one. Only classical (commuting) variables and geometrical aspects are discussed. It is also shown how interactions, curving classical space-time, generate a Hamiltonian-like structure in the phase-space of twistor particles. (Atomindex citation 11:509348)

UTTAC-11 PC **A03**/MF **A01**
Tsukuba Univ., Ibaraki (Japan). Tandem Accelerator Center.
Isospin Non-Conservation in exp 14 N(D,d') exp 14 N Reaction.
Y. Aoki, J. Sanada, K. Yagi, S. Kunori, and Y. Higashi. 1978, 32p
U.S. Sales Only.

The deuteron inelastic scattering experiments on exp 14 N were made at E/sub d/ = 10.03, 11.65, 14.82 and 17.88 MeV, with an emphasis on the isospin-forbidden excitation of the 2.31 MeV (0 exp +, T = 1) state. In order to clarify the reaction mechanism, we have performed analyses assuming both the direct reaction mechanism and compound nucleus formation. For the above isospin-forbidden transition, the calculation in the second-order DWBA,, which assumes the isospin mixing in the intermediate channels, reproduces fairly well the strong energy dependence of the angular distribution and the cross section. For the isospin-allowed transition the simple DWBA calculation gives reasonable agreement with the experiment. The present calculation shows that the observed isospin violation is well accounted for by the direct multi-step reaction mechanism assuming the isospin mixing in the intermediate channels. (Atomindex citation 11:507496)

WIS-Ph-79/43 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel).
Perturbative Field Theory Effects and Regge Pole Representation.
M. Bishari. 1979, 13p
U.S. Sales Only.

The possible role played by Regge poles in describing short distance physics is being studied. It is explicitly specified how the usefulness of the Regge poles concept, in the perturbative regime, depends on the structure of the field theory and the studied physical operators. An important quantitative complementarity principle, between Dual Topological Unitarization and QCD, emerges, in the sense that the former approach provides the non-perturbative initial conditions for the latter, when describing the evolution of the system from long to shorter distances. (Atomindex citation 11:507041)

WIS-Ph-79/45 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel).
Moments of XF sub 3 (X,Q exp 2), Regge Behavior and Experimental Tests of QCD.
M. Bishari. 1979, 11p
U.S. Sales Only.

It is pointed out that the Regge limit of the non-singlet observable xF sub 3 (x,Q exp 2) is controlled by the same leading singularity of the non-perturbative input xF sub 3 (x,Q sub 02) (Q sub 02 =1GeV exp 2 , Q exp 2 >Q sub 02). Independent of the detailed parton's interaction Lagrangian, we derive a rather narrow band for the values of the slopes of log Msub(n) versus log Msub(n)(Msub(n)(Qsup2) = integral sub(zero)sup(1)dx xsup(n-1) Fsub(3). (Atomindex citation 11:507043)

WIS-Ph-79/56 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Physics.
General Condition for Perturbation Theory around Gauge Copies.
Y. Frishman, and R. Roth. 1979, 7p
U.S. Sales Only.

The general condition for the validity of the usual perturbation expansion, in gauges with copies, is given. This includes abelian and non-abelian cases. The condition is that the potential of copies be "far" from each other. (Atomindex citation 11:507085)

WIS-Ph-79/60 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel).
New Approach to Perturbative and Non-Perturbative Dynamics: Regge Intercept and the Gluon Spin.
M. Bishari. 1979, 13p
U.S. Sales Only.

Relations connecting long distance with short distance dynamics are proposed. These relations are independent of the (a piori unknown) matching length scale, and provide interrelations among parameters characterizing soft and hard scattering processes. In particular, the observed planar Regge intercept imply an underlying field theory mediated by vector gluons. (Atomindex citation 11:507042)

20I. Plasma Physics

AD-A088 049/2 PC **A02**/MF **A01**
Naval Research Lab Washington DC
A Diverted Plasma Reversed Field Pinch.
Memorandum rept.,
Wallace M. Manheimer. 16 Jul 80, 11p Rept no. NRL-MR-4258
Contract DOE-EX-76-A-34-1006

This memo proposes a poloidal divertor as a method of reducing the strong plasma-wall interaction inherent in a reversed field pinch. (Author)

AD-A088 122/7 PC **A06**/MF **A01**
California Univ Berkeley Electronics Research Lab
Plasma Theory and Simulation.
Quarterly progress rept. no. 3, 1 Jul-30 Sep 79,
C. K. Birdsall, Alex Friedman, William Fawley, Yu Jiuan Chen, and Douglas Harned. 30 Sep 79, 112p
Contracts N00014-77-C-0578, DE-AS03-76F00034
Sponsored in part by Contract DE-AT03-76ET53064. See also report dated 30 Sep 78, AD-A065 157.

Contents: Filamentation in Charged Particle Beams; Drift-Cyclotron Instability Particle Simulation; Lower Hybrid Drift Instability Simulations Using ES1 Hybrid Code; Nonlinear Perturbation Theory of the Lower Hybrid Drift Instability; Control of Unwanted Beaming Instabilities; Transverse Oscillations of a Current Sheet in a Plasma - Theory; Transverse Oscillations of a Current Sheet in a Plasma - Simulation; Field Reversed Plasma Simulations, Quasineutral, in 2d; Field Reversed Plasma Stability; Linearized Hybrid Simulations in 3d; Pulsar Sparking, Digital Filtering in Time; Nonphysical Behavior of Hybrid Oscillations Due to Aliasing; ES1 Code; EM1 Code; EZOHAR Code; ES1 + EFL code; RINGHYBRID Code, Radial Simulation code ES1RB; Condition on Particle Shapes in 1d Radial Codes, Radial code Notes (R, R0, RZ, R0Z); RJET Development; Software Developments (FREX, COMOUT, DB, TIME); Report Generation.

AD-A088 228/2 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Plasma Diagnostics Using Photon-Induced Charge Transfer.
Memorandum rept.,
J. F. Seely, and R. C. Elton. 18 Aug 80, 44p Rept no. NRL-MR-4317

A method is described whereby a partner in a binary charge transfer process is photon-excited to a state in which the process can proceed at a greatly enhanced rate. The excited state may be real ('resonance-enhancement') or virtual. With the former, radiative decay fluorescent emission indicates directly the initial state density. Similarly, excited product decay indicates the reaction rate. With known cross sections, this can yield the density of the other reactant under conditions localized in both space and time by the inducing laser pulse. Numerous examples directly applicable to fusion devices are indicated. (Author)

AD-A088 331/4 PC **A06**/MF **A01**
California Univ Berkeley Electronics Research Lab
Plasma Theory and Simulation.
Quarterly progress rept. no. 4, 1 Oct-31 Dec 79,
C. K. Birdsall. 31 Dec 79, 102p
Contracts N00014-77-C-0578, DE-AS03-76F00034
Sponsored in part by Contract DE-AT03-76ET53064

In the last QPR, it was shown that our simulation exhibited strong ion trapping at saturation in the lower-drift-velocity regime with vE less than vti as our model had assumed a constant density and vE drift. The typical total ion momentum (Fig. 1a) and ion kinetic energy (Fig. 1b) are exponentially growing in time in the linear regime. In Fig. 1a, the net ion momentum increases in the negative x direction which is the wave propagation direction. Recall that ions in our model are initially in an electrostatic, steady equilibrium state with the ion diamagnetic drift velocity cancelled by the E x B drift velocity. (Author)

AD-A088 491/6 PC **A99**/MF **A01**
Michigan Univ Ann Arbor
On the Stability of Solitary Kinetic Alfven Waves.
J. P. Sheerin, and R. S. B. Ong. 21 Jun 79, 2301p AFOSR-TR-80-0613
Grant AFOSR-76-2904
Pub. in Physics Letters, v73A n5, 6, p389-390 15 Oct 79.

No abstract available.

CEA-R-4898(Pt.1) PC **A04**/MF **A01**
CEA Centre d'Etudes de Limeil, Villeneuve-Saint-Georges (France).

Suprathermal Electron Transport in a Laser Plasma - First Part: General Approach.
J. P. Nicolle. Jan 78, 60p
In French.
U.S. Sales Only.

The transport and slowing down of suprathermal electrons in a laser plasma was studied to estimate the preheating during a target implosion. The following processes are taken into account - diffusion in space and velocity due to Coulomb interactions with thermal electrons and ions, - interaction with the self-consistent electric-field which is calculated by using the diffusion approximation including a flux limitation for high density gradients, - Bremsstrahlung emission. The classical formulas in the Born approximation are used. The Coulomb diffusion is preponderant; the interactions with the electric field provide a coupling between suprathermal and thermal electrons. The Bremsstrahlung spectrum allows to test the numerical simulations (Monte-Carlo, multigroup diffusion) by measuring the X rays produced during the implosion. (Atomindex citation 09:409556)

CEA-R-4899 PC **A16**/MF **A01**
CEA Centre d'Etudes de Limeil, Villeneuve-Saint-Georges (France).
Study of Interaction and Heating Mechanisms in a Deuterium Laser Created Plasma.
These (D. es S.),
A. Saleres. Jan 78, 352p
In French.
U.S. Sales Only.

Theoretical and experimental studies about absorption, reflection, diffusion, emission and heating, involved in the interaction of neodymium or 5300 A lasers beams with a deuterium ice, are presented. Nanosecond pulses are delivered by the laser and total intensity is varied from 10 exp 13 W/cm exp 2 to 10 exp 15 W/cm exp 2 . Investigations of a laser plasma has been undertaken with harmonic generation. Laser intensity and density scale length in the vicinity of nc/4 and nc have been measured. Harmonic emissions have been correlated with reflection of the laser beam, expansion of ions and neutron emission. It appears that 3.5x10 exp 13 W/cm exp 2 is both the threshold for nonlinear interaction mechanisms and nonlinear heating of the plasma. (Atomindex citation 09:409579)

CEA-R-4903 PC **A08**/MF **A01**
CEA Centre d'Etudes de Limeil, Villeneuve-Saint-Georges (France).
Experimental Investigation of the Plasma Focus Discharge.
These (D. Ing.),
Christian Nazet. Feb 78, 175p
In French.
U.S. Sales Only.

One reports the main experimental results obtained on low current level Focus discharges: 200 kA and 50 kA. Neutron and X-ray scaling laws from 50 kA up to 2500 kA have been established by taking into account all the results obtained at the Centre d'Etudes de Limeil. These scaling laws show the great interest of a 10 MA Plasma Focus device. To achieve this high current level, one present the experimental study of an explosive current generator driven plasma Focus. (Atomindex citation 10:431585)

DOE/ET/53045-1 PC **A03**/MF **A01**
College of William and Mary, Williamsburg, VA. Dept. of Physics.
Most Probable Ideal Magnetohydrodynamic Equilibria. I. Tokamak Regime and Quasi-Force-Free States.
J. Ambrosiano, and G. Vahala. 31p
Contract AS05-76ET53045

Given the information on only a few global parameters (e.g., energy E, magnetic helicity H, flux phi, current I, ... - constraints that can be either experimentally imposed or constants of the motion...) the statistical theory of Montgomery, Turner and Vahala, which determines the most probable ideal magneto-hydrodynamic equilibrium compatible with the given information, is investigated in the tokamak regime. It is shown that in this regime of phi >> I one obtains typical experimentally relevant profiles e.g. B/sub theta/ << B/sub z/, slightly diamagnetic toroidal fields with torodial currents peaked on axis. A sequence of most probable equilibria, with decreasing ratio of E/H at fixed phi and I, is investigated showing less diamagnetic states with rapidly decreasing plasma beta. Linearized analytic force-free states can also be constructed for certain regimes of the global parameters together with their nonlinear quasi-force-free counterparts. (ERA citation 05:031359)

EUR-CEA-FC-1000 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Non Linear Interaction Between a Langmuir Wave and a Ballistic Perturbation.
F. Gervais, J. Olivain, A. Quemeneur, and M. Trocheris. May 79, 36p
U.S. Sales Only.

The theoretical solutions of the Landau-Vlasov initial value problem giving mode-mode coupling usually neglect the free-streaming contribution. We solve theoretically this problem including the ballistic terms. We find that a new mode appears resulting from the nonlinear interaction between the Landau component and the ballistic perturbation. The amplitude of this mode is calculated as a function of distance and compared with experimental results in a plasma column. (Atomindex citation 11:509719)

EUR-CEA-FC-1002 PC **A06**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Spectrometry with High Count Rate for the Study of the Soft X-Rays. Application for the Plasma of WEGA.
P. Brouquet. Apr 79, 109p
In French.Thesis.
U.S. Sales Only.

The plasma of the WEGA torus, whose electron temperature varies between 0.5 and 1 keV, emits electromagnetic radiation extending to wavelengths of the order of 1A. Different improvements performed on a semi-conductor spectrometer have permitted the study of this emission in the soft X ray region (1 keV - 30 keV) at a count rate of 3.10 exp 5 counts/s with an energy resolution of 350 eV. For each plasma shot, this diagnostic gives 4 measurements of the plasma electron temperature and of the effective charge, Zeff, with a time resolution of 5 ms. The values of the electron temperature and of the effective charge derived from the study of soft X rays are in agreement with those given by other diagnostic methods. (Atomindex citation 11:509704)

EUR-CEA-FC-1006 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Electron Temperature Profile Control Using Electron Cyclotron Resonance Heating.
R. Cano, and A. Cavallo. Jun 79, 37p
U.S. Sales Only.

A computer code (MAKOKOT) has been used to simulate ECRH on two tokamaks, TFR and T-10, where the experimental conditions are well known. The T-10 cases are particularly relevant since it is the only large tokamak which is attempting to use this heating method at the present time. (Atomindex citation 11:509707)

EUR-CEA-FC-1009 PC **A06**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Realization of a Multichannel Interferometer Used for 2 mm Microwave Measurements. Application to Electron Density Distribution Measured in a Plasma of Stellarator.
M. Durvaux. Jun 79, 103p
In French.
U.S. Sales Only.

An analysis of the various elements of a seven channel microwave interferometer is presented. The interferometer is suitable for operation on a toroidal type device where the access ports are of limited size. The magnitude of the plasma number density to be measured requires the use of 2 mm microwaves. The specific problems of the propagation of guided mm waves are studied in detail, as well as those concerning the refraction inside the plasma. A reliable, on-line electronic processing system has been developed which allows a precise and easy record of the measured plasma density as well as a direct and instantaneous display of its variation as a function of time. (Atomindex citation 11:509715)

EUR-CEA-FC-938 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Nonlinear Calculations of MHD Stability. 1. Stationary Convective Solutions.
E. K. Maschke, R. B. Paris, and B. Saramito. Feb 78, 48p
In French.
U.S. Sales Only.

A 2-dimensional single fluid MHD numerical code has been developed for the study of MHD modes in the presence of resistivity, viscosity and thermal conduction. In addition to these dissipative effects, the equations contain sources of heat and mass. As a first application of the code, stationary convective modes have been calculated in a cylindrical plasma layer with a density gradient and a magnetic field. The stability limit and the amplitude of the different stationary modes have been obtained and are found to be in good agreement with those predicted by the non-linear theory. (Atomindex citation 10:431579)

EUR-CEA-FC-944 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Electron Cyclotron Emission from Thermal Plasmas.
I. Fidone, and G. Granata. Feb 78, 29p
U.S. Sales Only.

Electron cyclotron radiation from a warm inhomogeneous plasma is investigated. A direct calculation of the emissive power of a plasma slab is performed using Rytov's method and the result is compared with the solution of the transfer equation. It is found that, for arbitrary directions of emission, the two results differ, which reflects the fact that Kirchhoff's law is not generally obeyed. (Atomindex citation 10:431537)

EUR-CEA-FC-945 PC **A02**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Identification of Forbidden Lines in the Soft X-Ray Spectrum of the TFR Tokamak.
M. Klapisch, J. L. Schwob, M. Finkenthal, B. S. Fraenkel, and S. Egert. Jan 78, 16p
In French.
U.S. Sales Only.

Two quite intense lines, at 58.832 A and 57.927 A appearing in the TFR Tokamak are attributed to E2 transitions 3d exp 10 - 3d exp 9 4s (J=2) of MoXV. This classification is based on the comparison between experimental and computed wavelengths and intensities of these lines in the Tokamak plasma. The great influence of cascades on the intensities is shown. It is shown that similar lines for other ionization stages of Mo should be much weaker. (Atomindex citation 10:431562)

EUR-CEA-FC-947 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Numerical Simulation of the Impurity Peak Positions in TFR 400 Discharges.
Mar 78, 27p
In French.
U.S. Sales Only.

A numerical code which solves evolution equations for the densities of each ionization level of

oxygen and molybdenum is used for simulating the stationary state of T.F.R. discharge. Using neo classical (Pfirsch-Schluter) fluxes and anomalous 'spreading' fluxes, gives the positions of oxygen peaks inwardly displaced from those calculated using the coronal equilibrium model, in reasonable agreement with the experimental measurements. Reasonable agreement with the experiment for the emitted photon is also found. In addition the positions of the maxima of the molybdenum peaks are in agreement with both the coronal equilibrium model and experimental observations. (Atomindex citation 10:431515)

IAE-3114 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Impurity Dynamics in a Z-Pinch.
K. G. Gureev, and E. B. Sergeev. 1979, 29p
In Russian.
U.S. Sales Only.

In an analytical way studied is the compression of deuterium and xenon mixture under the action of the ponderomotive force at the expense of the electric current, running through the gas. The consideration is made in cylindrical configuration. A model of three-liquid hydrodynamics is used. The friction and the heat transfer between the plasma components are taken into consideration, as well as the change of its composition due to ionization. The Z pinch plasma sheath dynamics and structure are determined. It is shown that unlike the case of pure deuterium, in case of the deuterium and xenon mixture the anomalous plasma conductivity is of great importance. At low operation pressures of the mixture the anomalous conductivity promotes the mixture separation from deuterium in the process of plasma sheath compression in the direction to the charge axis. The results of the work permit to interprete the phenomenon of "running away" of the plasma sheath in noncylindrical pinch from a new point of view. The phenomenon essence is as follows: the sharp acceleration of the sheath redrawing in the direction tc the discharge axis. It is observed only in the mixture of deuterium and xenon. Heterogeneous mass distribution in the sheath may occur in the case if xenon in the redrawing fails to be drawn into the compression at the expense of the friction with deuterium. Then due to the anomalous conductivity the sheath looses xenon and becomes lighter. The sheath mass losses result in the decrease of the radius of its curvature, in the quick plasma following out, and in the sharp sheath acceleration up to Alfven velocities. At the transition to thermonuclear pinch systems the depth of xenon ionization increases so much that the plasma energy losses at radiation due to the addition become essential in the energetic balance of the system. (Atomindex citation 11:506689)

IAE-3121 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Hydrogen Atom Charge Exchange on Multicharged Ions in a Hot Plasma.
V. A. Abramov, F. F. Baryshnikov, and V. S. Lisitsa. 1979, 17p
In Russian.
U.S. Sales Only.

Using hydrogen atom symmetry properties calculated are the cross sections of the hydrogen recharge on nuclei of multicharged ions with the regard for final states degeneration. The transitions between these states taking into account, being caused by the rotation of internuclear axis, results in the qualitative change of the sigmadependence on the v ion velocity at small v (degree decrease of the cross section instead of the expotentional one in the Landau-Ziner model) and in the sufficient increase of the cross section in maximum, as well. The cross sections are calculated in the wide range of velocities and Z charge values. It is shown that the cross section may be approximated with the accuracy of $<= 10\%$. A detail comparison is made with the calculation results by different authors. A distribution of final states along the orbital moments is found. The change of intensities of the O exp 7+ ion spectral lines is calculated at neutral hydrogen beam intection under the conditions close to those of the experiment at the ORMAK installation. (Atomindex citation 11:506654)

INIS-mf-5470 PC **A08**/MF **A01**
Technische Hogeschool, Eindhoven (Netherlands).
Equilibrium and Stability of a Rotating Plasma.
P. A. E. M. Janssen. 1 Jun 79, 151p
Thesis.
U.S. Sales Only.

The author considers the equilibrium and stability of a rotating plasma. The kinetic equations for ions and electrons supplemented with the Maxwell equations and the appropriate boundary conditions are used. Two different models for the rotating plasma are considered: the equilibrium of a 'fast' rotating plasma (Magneto Hydrodynamic ordering) and the stability of a slowly rotating, 'weakly' unstable plasma (Finite Larmor Radius ordering). A striking difference between these orderings is the fact that, regarding the stability of the plasma, for a F.L.R. plasma viscosity effects due to the finite Larmor radius are important, whereas in a M.H.D. plasma they are negligible (at least to the required order). (Atomindex citation 11:506698)

IPP-0/40 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Method of Measuring the Current Density Distribution and Emittance of Pulsed Electron BEAMS.
H. B. Schilling. Jul 79, 9p
In German.
U.S. Sales Only.

This method of current density measurement employs an array of many Faraday cups, each cup being terminated by an integrating capacitor. The voltages of the capacitors are subsequently displayed on a scope, thus giving the complete current density distribution with one shot. In the case of emittance measurements, a moveable small-diameter aperture is inserted at some distance in front of the cup array. Typical results with a two-cathode, two-energy electron source are presented. (Atomindex citation 11:509744)

IPP-0/41 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Development and Investigation of Finite Energy Spread and Improved Emittance Relativistic Electron BEAMS.
J. Fink, H. B. Schilling, and U. Schumacher. Jul 79, 17p
U.S. Sales Only.

The experiments with a divided cathode in an electron beam gun, one half of which is connected via a resistor with the high voltage terminal, lead to the generation of a low emittance electron beam with instantaneously two different energies which is suitable for suppression of collective instabilities in an electron ring accelerator. The energy difference can be varied up to 100 keV proportional to the resistance, and the sub-currents are equal. The beam parts are well separated and focussed at the injection area of the compressor, and their radial distance is about equal to the radial difference of the corresponding closed orbits, such that electron ring formation with minimum radial betatron oscillations should be possible. (Atomindex citation 11:509717)

IPP-3/51 PC **A07**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Current Disruption in Toroidal Devices. Proceedings.
Jul 79, 148p CONF-790210-
Conference on current disruptions, (IAEA), Garching, F.R. Germany, 14 Feb 1979.
U.S. Sales Only.

Attempts at raising the density or the plasma current in a tokamak above certain critical values generally result in termination of the discharge by a disruption. This sudden end of the plasma current and plasma confinement is accompanied by large induced voltages and currents in the outer structures which, in large tokamaks, can only be handled with considerable effort, and which will probably only be tolerable in reactors as rare accidents. Because of its crucial importance for the construction and operation of tokamaks, this phenomenon and its theoretical interpretation were the subject of a three-day symposium organized by the International Atomic Energy Agency and Max-Planck-Institut fuer Plasmaphysik at Garching from February 14 to 16. (Atomindex citation 11:509737)

IPPJ-T-31 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Characteristics of Fast Response INSb Submillimeter Detector.
K. Ichimura, K. Sakai, K. Kawahata, and J. Fujita. Mar 79, 15p
U.S. Sales Only.

A highly sensitive, fast responding n-InSb detector for the millimeter and submillimeter region has been fabricated and optimized for use to measure the electron cyclotron emission from tokamak plasmas, in connection with bandpass filters or a rapid scanning Fourier transform spectrometer. The detector element is made of high purity n-type InSb and is in magnetic fields up to 12 kG. The spectral responsivity, response time and noise equivalent power (NEP) of the detector have been measured. The response time of 0.2 mu sec, and NEP of 1.0 x 10 exp -10 W/ sqrt H sub(z) at 4.2 K and 8 kG and that of 2.3 x 10 exp -11 W/ sqrt H sub(z) at 1.8 K and 10 kG are obtained. These values are useful for the measurements of electron cyclotron emission from tokamak plasmas. (Atomindex citation 11:506692)

IPPJ-375 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Quantum Effects on the Temperature Relaxation in Plasmas.
Kazuo Sakai, and Osamu Aono. Mar 79, 30p
U.S. Sales Only.

This work was carried out under the collaborating Research Program at Institute of Plasma Physics, Nagoya University. Further communication about this report is to be sent to the Research information Center, Institute of Plasma Physics, Nagoya University, Nagoya 464, Japan. The rate of equilibration of difference between the ion and electron temperatures is obtained on the basis of the unified theory, in which the collective and binary interactions are both treated properly. The electrons obey the Fermi distribution of arbitrary degeneracy. The rate decreases owing to the degeneracy. Even in the nondegenerated case, the quantum effect appeares in the argument of the Coulomb logarithm. When the de Broglie wave length of the electron is much longer than the radius of close collision, the results agree with those obtained on the Born approximation. In the opposite limit, the classical theory applies. For other cases, graphical examples are given. (Atomindex citation 11:506736)

JINR-9-11370 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods.
Non-Linear Theory of Electron Beam and Plasma Interaction.
S. T. Ivanov, K. A. Reshetnikova, and N. A. Filippova. 1978, 15p
In Russian.
U.S. Sales Only.

A non-linear stationary solution for relativistic beam and homogeneous unbaunded plasma interaction is considered in hydrodynamics approach. The beam and the plasma are magnetized. That allows one to consider the motion to be one - dimensional. Non-linearity is connected with the wave effect on the electron beam motion. Plasma electron motion is thought to be linear. Non-linear wave equation has been obtained. The equation is of a finer character, than the known one. It's first integral has been found. This permits to determine the wave amplitude value excited by the beam in the plasma and, hence, the electromagnetic field energy as the current and the beam energy function. The utilization of the new method of the sclution has allowed to enlarge the range of the theory application on the occasion of relativistic beam motion in the coordinate system moving with the phase wave velocity. It hasn't been considered earlier. (Atomindex citation 09:405805)

KFTI-77-33 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.

Rotation and Transfer of Plasma Filament Particles under the Effect of External Forces and Currents.
V. V. Nemov. 1977, 21p
In Russian.
U.S. Sales Only.

Rotation of plasma filament under the effect of external forces has been theoretically studied. These forces, for instance, can appear under the plasma heating by electromagnetic waves or by neutral particle beam injection. The data obtained make it possible to conclude on the possibility to avoid the dangerous velocity of the plasma filament rotation under the high-frequency plasma heating or the neutral particle beam heating. To achieve this it is necessary, first, that the intensity of heating was large enough, so that the growth rate of plasma temperature was of the order of the energy transfer rate from the wave or beam into the plasma, second that the wave phase rate in the direction perpendicular to the magnetic field or velocities of neutral particle beam were greater than the ion velocity. In this case the rotation velocity of the plasma filament achieved during the heating, appears to be less than the ion thermal velocity. (Atomindex citation 10:443062)

KFTI-79-23 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Using of Far-Infrared Waves for High-Temperature Plasma.
V. L. Berezhnyi, V. I. Kononenko, and I. K. Nikol'skii. 1979, 24p
In Russian.
U.S. Sales Only.

The calculations are made to find out the optimum length of the operation wave of interferometer designed for the 10 exp 13 -10 exp 15 cm exp -3 density plasma investigation. It is shown that for the investigation of plasma with the expected density of 10 exp 14 cm exp -3 in the center of the plasma filament cross section symmetry and with the cross section diameter of about 100 cm the operation wave of interferometer should be within the range 50 mu m < lambda < 600 mu m. Constructed are the Michelson, Mach-Rozhdestvenskij and three-mirrored interferometers on the basis of the HCN laser with the 337 mu m wave length, which is in an intermediate position within the above range. To measure the space distribution of electron density constructed is an interferometer with the beam scanning. Their designs and principles of operation are described, the limits of their application are shown. The minimum phase shift at calibration of interferometer is 2PI/36. The quick-action of three-mirror interferometer measured in the experimental way achieves 1 MHz. Interferometers have been used for measurings on the electronless induction discharge, on the moving plasmoid generated by the coaxial plasma accelerator and on the single-cut torsatron. (Atomindex citation 11:509700)

N80-30118/7 PC **A03**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Applied Mathematics.
A Singular Boundary Value Problem Arising in a Pre-Breakdown Gas Discharge.
O. Diekmann, D. Hilhorst, and L. A. Peletier. Jun 79, 36p MC-TW-174/79
Submitted for Publication.

The nonlinear two point boundary value problem epsilon XY double prime + (g(x)-y) prime = 0, y(0) = 0, y(R) = k, where g is a given function is considered. It is proven that the probelem has a unique solution. The limiting behavior of this solution as R approaches infinity and as epsilon decreases to zero is studied. It is shown how a so called prebreakdown discharge in an ionized gas between two electrodes can be described by an equation of this form, leading to a physical interpretation of the mathematical results.

N80-30197/1 PC **A03**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung.
Research Activities of the Institute for Plasma Research Forschungsbericht 1978.
Annual Report, 1978.
1979, 49p
Text in German.

Activities in the following areas are described: waves and plasma heating, plasma simulation, high tension belt pinch, laser experiments, and plasma focusing.

N80-30198/9 PC **A03**/MF **A01**
Technische Hogeschool, Eindhoven (Netherlands). Dept. of Electrical Engineering.
The Dispersion Relation of Electrothermal Waves in a Nonequilibrium Magnetohydrodynamic Plasma.
P. Massee. Dec 78, 27p TH-78-E-92, ISBN-90-6144-092-0

The experimental verification of the dispersion relation for electrothermal waves is described. The theoretical derivation of this relation as presented differs from the usual approach as the experiment requires an analysis in terms of real frequency and complex wave number. In the experiment, values for electron temperature of up to 2400 K and for electron density of up to 700 exa/cu cm were realized. The properties of the heavy particle gas were not characteristic for the situation in a closed cycle magnetohydrodynamic generator since electrothermal waves are essentially a property of the electron gas only. Hence, the waves were excited artificially in the stable regime so that they were damped, which set high requirements on the measuring technique. The ratio of the amplitudes at two successive double probes was measured as well as the phase shift between the two signals. Experimental results which are discussed and compared with theoretical predictions, show reasonably good agreement for the ratio of amplitides. However, measurements of the phase shift show little agreement with theoretical predictions, a fact for which no explanation can be given.

ORNL/tr-4667 PC **A05**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Problems in the Evolution of Equilibria of Toroidal Configurations.
L. E. Zakharov, and V. D. Shafranov. Jul 80, 80p
Contract W-7405-ENG-26
C IAE--3075, 1978.

Phenomena are described that have complicated the problem of the evolution of equilibrium configurations (i.e., the change in time of the conditions of MHD equilibrium, the form of the magnetic surfaces, the current distribution, etc.) in the presence of relaxation effects related to finite plasma conductivity. As we have noted in an earlier paper, the evolution of equilibria is distinct from the general problem of modeling processes in the plasma because of the independence of magnetic field diffusion from diffusion of the plasma itself. This allows one to formulate the evolution problem cleanly, without accounting for the complicated processes of the transport of particles and heat. In the paper we give basic equations and boundary conditions for either the current or the poloidal field in various formulations that occur when the plasma configuration is changed by a pressure rise and the equilibrium is maintained either by a shell or by external fields. We consider fundamental questions qualitatively, using characteristic examples to illustrate special problems in the evolution of equilibria. Specifically, we consider the process of the possible decay of a high pressure configuration obtained under flux-conserving conditions. (ERA citation 05:031349)

PB80-221534 Not available NTIS
National Bureau of Standards, Washington, DC.
Tokamak-Generated Tungsten Radiation Identified in Ag I Isoelectronic Sequence (W XXVIII).
Final rept.,
J. Sugar, and V. Kaufman. Jun 80, 3p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Physical Review, A. General Physics 21, n6 p2096-2098 Jun 80.

A new interpretation of the tungsten spectrum observed in 1.5-keV tokamak plasmas at Oak Ridge (the ORMAK) and Princeton (the PLT) is given. An isoelectronic extrapolation of the AgI sequence from newly observed data through Ho XXI strongly suggests that the tokamak radiation belongs to the transition array 4d104f-4d94f2 of W XXVIII. This is well supported by comparison with a calculation of the spectrum. An earlier interpretation incorrectly attributed the radiation to a superposition of complex transition arrays from mugh higher ionization stages. n identical pattern was seen for zymosan, a known C3 activator. Nylon induced conversion was Ca++ dependent, suggesting involvement of C1, and was highly temperature dependent. Nylon and zymosan particles also aggregated canine platelets in vitro as monitored by standard aggregometry. Cell adhesion to surfaces was studied after profound reduction of C3 levels in vivo with cobra venom factor (CVF)(Naja Haje). CVF had little effect on cell counts, coagulation times, or ADP levels required to induce platelet aggregation in vitro. Both platelet and leukocyte adhesion was sharply reduced in experiments involving CVF treated dogs relative to that seen in identical experiments carried out with normal dogs. The results suggest the involvement of complement activation in mediating leukocyte and platelet adhesion to polymers in the early phases of the blood/surface interaction in the context of the canine model.

PB80-854656 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Mirrors. September, 1975-June, 1980 (Citations from the NTIS Data Base).
Rept. for Sep 75-Jun 80,
John H. Frey. Jun 80, 189p NERACUSGNT0808
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the analysis, potential, and review of magnetic mirror configurations for plasma confinement. Citations include discussions of magnetic field configurations, plasma stability and instability, beam-plasma systems, electron rings, and tandem mirror systems. (Contains 132 citations.)

PB80-854664 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Mirrors. January, 1978-May, 1980 (Citations from the Energy Data Base).
Rept. for Jan 78-May 80,
John H. Frey. Jun 80, 186p NERACEDBNT0808
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the analysis, potential, and review of magnetic mirror configurations for plasma confinement. Citations include discussions of magnetic field configurations, plasma stability and instability, beam-plasma systems, electron rings, and tandem mirror systems. (Contains 200 citations.)

PB80-854672 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Mirrors. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 44p NERACEI NT0808
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the analysis, potential, and review of magnetic mirror configurations for plasma confinement. Citations include discussions of magnetic field configurations, plasma stability and instability, beam-plasma systems, electron rings, and tandem mirror systems. (Contains 35 citations.)

PB80-854680 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Mirrors. October, 1977-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Oct 77-May 80,
John H. Frey. Jun 80, 168p NERACIAANT0808
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the analysis, potential, and review of magnetic mirror configurations for plasma confinement. Citations include discussions of magnetic field configurations, plasma stability and instability,

beam-plasma systems, electron rings, and tandem mirror systems. (Contains 165 citations.)

PPPL-1670 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Externally Launched Ion Berstein Wave in the ACT-1 Toroidal Device.
M. Ono, and K. L. Wong. Jun 80, 14p
Contract AC02-76CH03073

In a hydrogen plasma (T/sub e/ = 2.5 eV, T/sub i/ = 1.5 eV), excitation of ion Bernstein waves by an externally placed electrostatic antenna has been investigated for omega approx. = 2 omega / sub i/. Mode transformation of the electron plasma wave at omega approx. = omega /sub pi/ without observable reflection was observed, followed by strong excitation of the ion Bernstein wave. Detailed measurements of k/sub perpendicular to/(omega ,k/sub parallel/) and of the wave packet trajectory show excellent agreement with theory. (ERA citation 05:029911)

Rijnhuizen-79-120 PC **A12**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
Collisional Plasma Transport: Two-Dimensional Scalar Formulation of the Initial Boundary Value Problem and Quasi One-Dimensional Models.
J. W. Mugge. Oct 79, 252p
U.S. Sales Only.

The collisional plasma transport problem is formulated as an initial boundary value problem for general characteristic boundary conditions. Starting from the full set of hydrodynamic and electrodynamic equations an expansion in the electron-ion mass ratio together with a multiple timescale method yields simplified equations on each timescale. On timescales where many collisions have taken place for the simplified equations the initial boundary value problem is formulated. Through the introduction of potentials a two-dimensional scalar formulation in terms of quasi-linear integro-differential equations of second order for a domain consisting of plasma and vacuum sub-domains is obtained. (Atomindex citation 11:506722)

RISO-384 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Calculation of the Ion Velocity Distribution Function in a Rotating Plasma.
L. W. Joergensen. Oct 78, 26p
U.S. Sales Only.

Using a single-particle orbit picture of the plasma ions in the puffatron (a device with rotating plasma), the corresponding ion velocity distribution function is calculated. The spread in the ion Larmor velocity due to the initial break-down phase is taken into account assuming a parabolic distribution for this spread. The calculated ion velocity distribution function is integrated along a chord in order to make it possible to compare the calculations with suitable measurements along a chord of the ion velocity spectrum. (Atomindex citation 10:443013)

RISO-385 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Alpha-Particle Heating of a Thermonuclear Plasma.
O. Kofoed-Hansen. Sep 78, 45p
U.S. Sales Only.

The theory of the slowing down and thermalization of alpha-particles created in and slowed down by a plasma considered as an undisturbed thermal bath is re-examined. The considerations are limited to a homogeneous, isotropic plasma. Also the alpha-particles are considered as a density-wise negligible component of the plasma. Under these circumstances, all essential parts of the theory can be studied analytically. Thus all standard approximations can be studied with precision. However, the conclusions do not differ from numerical results earlier obtained by numerous authors. In this sense the present paper must be considered as a review based on analytical methods. The standard approximations referred to are such as the neglect of the variation of the Coulomb logarithm with velocity, the influence of quantum-mechanical effects, the significance of the impact parameter cut-off (the Debye length), and the assumption of a Maxwellian plasma. Some of these effects have been examined analytically by other authors. However, the present work shows that the Fokker-Planck equation can be solved without the aid of computers for the simplest set of standard approximations. The result thereof is a determination of slowing down rates and rate of growth of energy spread and thereby thermalization of the alpha-particles. (Atomindex citation 10:443027)

TRITA-PFU-78-06 PC **A03**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik med Fusionsforskning.
Balance of a Linear Plasma Column Confined in a Transverse Magnetic Field.
B. Lehnert. Aug 78, 37p
U.S. Sales Only.

The equilibrium features are investigated of a straight plasma column being confined in a purely transverse magnetic field, part of which is being generated by external conductors. Provided that stability can be secured at high beta values, the reduced transport of particles and heat in the axial direction should allow for large axial temperature gradients. It is then expected that temperatures even leading to ignition can be achieved in a pure plasma, at technically realistic column lengths. (Atomindex citation 10:434654)

TRITA-PFU-79-08 PC **A03**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden).
Plasma Stabilization in Presence of an Inhomogeneous Magnetic Vacuum Field.
B. Lehnert. Jul 79, 28p
U.S. Sales Only.

The problem of plasma stability in presence of an immersed inhomogeneous magnetic vacuum field is treated in terms of the energy principle of magnetohydrodynamic disturbances. Physically relevant boundary conditions are discussed, such as those which exclude electric surface currents and take realistic current and pressure profiles into account. Two types of configurations are discussed in connection with electromagnetic mode stabilization by means of an inhomogeneous vacuum field. First, in the low-beta case of closed vacuum field geometry, a large class of perturbations is found to be stabilized by this type of field, Second, in the high-beta case of open vacuum field geometry, such as in Extrap configurations with a pinch being immersed in a strongly inhomogeneous transverse vacuum field, a sufficient condition for stability is found, being applicable at least to kink-like modes. This latter condition replaces that of the Kruskal-Shafranov limit and predicts that stabilization should become possible for long wave-length kinks in Extrap geometry. (Atomindex citation 11:509733)

UEC-S-003/78 PC **A02**/MF **A01**
Universidade Estadual de Campinas (Brazil). Inst. de Fisica.
Anomalous Plasma Resistivity in Pre-Pulsed Flashlamp Discharges.
R. M. O. Galvao, and A. Marotta. 7p
U.S. Sales Only.

It is shown that the V-i characteristic of discharges in flashlamps operating in the pre-pulsed mode at high current densities follows the relationship V= K sub 0 i sup(0,85). This result is interpreted in terms of the Sagdeev-Galeev anomalous resistivity due to current-driven ion acoustic turbulence. (Atomindex citation 10:431542)

VTT-ENT-Pub-15 PC **A02**/MF **A01**
Valtion Teknillinen Tutkimuskeskus, Espoo (Finland).
One-Dimensional Plasma Simulation Studies.
A. Friberg, and J. Virtamo. 1976, 20p
U.S. Sales Only.

Some basic plasma phenomena are studied by a one-dimensional electrostatic simulation code. A brief description of the code and its application to a test problem is given. The experiments carried out include Landau damping of an excited wave, particle retardation by smoothed field and beam-plasma instability. In each case, the set-up of the experiment is described and the results are compared with theoretical predictions. In the theoretical discussions, the oscillatory behaviour found in the Landau damping experiment is explained, an explicit formula for the particle retardation rate is derived and a rudimentary picture of the beam-plasma instability in terms of quasilinear theory is given. (Atomindex citation 09:405784)

20J. Quantum Theory

AD-A088 077/3 PC **A04**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
On the Analogy between Mathematical Problems of Non-Linear Filtering and Quantum Physics.
Interim rept.,
Sanjoy K. Mitter. Jun 80, 66p LIDS-P-1006, AFOSR-TR-80-0583
Grants AFOSR-77-3321, AFOSR-77-3281

The main thesis of this paper is that there are striking similarities between the mathematical problems of stochastic system theory, notably linear and non-linear filtering theory, and mathematical developments underlying quantum mechanics and quantum field theory. Thus the mathematical developments of the past thirty years in functional analysis, lie groups and lie algebras, group representations, and probabilistic methods of quantum theory can serve as a guide and indicator to search for an appropriate theory of stochastic systems. In the current state of development of linear and non-linear filtering theory, it is best to proceed by 'analogy' and with care, since 'unitarity' which plays such an important part in quantum mechanics and quantum field theory is not necessarily relevant to linear and non-linear filtering theory. The partial differential equations that arise in quantum theory are generally wave equations, whereas the partial differential equations arising in filtering theory are stochastic parabolic equations. Nevertheless the possibility of passing to a wave equation by appropriate analytic continuation from the parabolic equation, reminiscent of the current program in euclidean field theory, should not be overlooked. (Author)

CNRS-CPT-79-P-1083 PC **A02**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Extended Feynman Formula for Harmonic Oscillator.
P. A. Horvathy. Jan 79, 9p
U.S. Sales Only.

A slight modification of Feynman's original method leads to the Maslov correction in the path integral formula of a harmonic oscillator. Caustics are treated in a direct geometry way. (Atomindex citation 11:506300)

CNRS-CPT-79-P-1084 PC **A03**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Class of Explicitly Soluble, Local, Many-Center Hamiltonians for One-Particle Quantum Mechanics in Two and Three Dimensions. I.
A. Grossmann, R. Hoegh-Krohn, and M. Mebkhout. Feb 79, 37p
U.S. Sales Only.

An explicit formula for the resolvent of a class of one-particle, many-center, local Hamiltonians is derived. This formula gives, in particular, a full description of a model molecule given by point interactions at n arbitrarily placed fixed centers in three dimensions. It also gives a three-dimensional analogue of the Kronig-Penney model. (Atomindex citation 11:506291)

CNRS-CPT-79-P-1099 PC **A02**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Feynman Integral for Spin.
P. Horvathy. Apr 79, 10p
U.S. Sales Only.

Following Gawedzki's ideas, the time evolution of a non-relativistic spinning particle moving in exter-

nal field is expressed in terms of geometrically defined generalized path integrals. The same method applied to the interaction between the spins of the proton and electron bound in the hydrogen atom leads to hyperfine and Zeeman splitting. An alternative approach allows us to establish the links between Feynman's method and the Souriau-Kostant theory of geometric quantization. (Atomindex citation 11:509368)

ICEFIZ-FT-155-1978 PC **A02**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Substantiating Problems of Quantum Mechanics.
J. Gottlieb. May 78, 16p
U.S. Sales Only.

Some basic problems, related to the spaces and the operators necessary to describe quantum-mechanical phenomena, are entered upon from a new axiomatic standpoint. Some generalizations are offered required by convergence criteria, concerning the Fourier transform, the Fourier product and the equation of eigenvalues. Physical arguments are brought to support such generalizations, and an analysis in view of organizing the structure of the proposed spaces is undertaken. (Atomindex citation 11:509365)

IFIN-FT-150-1978 PC **A03**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
SO(4,2) Algebra and Central Motion.
M. Iosifescu. Feb 78, 39p
U.S. Sales Only.

A canonical realization of the so(4,2) algebra for three degrees of freedom is determined, which conserves the essential properties of the so(4,2) algebra associated by Gyorgyi to the Kepler problem; Bacry-Gyorgyi coordinates are generalized. The canonical realization of the so(4,2) algebra is related to a classical central motion, where it plays a role similar to the role played by the so(4,2) algebra in the Kepler problem. (Atomindex citation 11:509370)

IFIN-FT-154-1978 PC **A02**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Born Approximation to a Perturbative Numerical Method for the Solution of the Schrodinger Equation.
Gh. Adam. May 78, 24p
U.S. Sales Only.

A perturbative numerical (PN) method is given for the solution of a regular one-dimensional Cauchy problem arising from the Schroedinger equation. The present method uses a step function approximation for the potential. Global, free of scaling difficulty, forward and backward PN algorithms are derived within first order perturbation theory (Born approximation). A rigorous analysis of the local truncation errors is performed. This shows that the order of accuracy of the method is equal to four. In between the mesh points, the global formula for the wavefunction is accurate within O(h exp 4), while that for the first order derivative is accurate within O. (Atomindex citation 11:509340)

IFIN-FT-163-1978 PC **A03**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Canonical Realization of the So(4,2) Algebra.
M. Iosifescu. Dec 78, 30p
U.S. Sales Only.

On each six-dimensional symplectic manifold a coordinate-free realization of the so(4,2) algebra can be constructed, the generators of which satisfy the polynomial relations fulfilled by the so(4,2) generators associated to the Kepler problem. This realization contains as a particular case a number of realizations of so(4,2) known in the literature. A coordinate-free expression of the symplectic 2-form of a six-dimensional symplectic manifold in terms of the so(4,2) generators defined on it is obtained. (Atomindex citation 11:509371)

ITEP-60(1979) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Conservation Laws and Lax Representation of Benney's Long Wave Equations.
D. R. Lebedev, and Yu. I. Manin. 1979, 8p
U.S. Sales Only.

The aim of the note is to supply a new and very simple formula for the conserved densities and to show that the Benney's long wave equations admit a standard Lax representation widely used in the "inverse scattering method" of solving wave equations. The system of equations is shown to possess an infinite number of conservation laws. It is also demonstrated that the Benney's equations admit the construction of Hamiltonian systems with Lax-type representations. A new type of universal conserved densities is introduced. (Atomindex citation 11:506328)

ITEP-71(1979) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Differential Forms of Supermanifolds.
P. A. Beresin. 1979, 11p
U.S. Sales Only.

The theory of differential and pseudo-differential forms on supermanifolds is constructed. The definition and notations of superanalogy of the Pontryagin and Chern characteristic classes are given. The theory considered is purely local. The scheme suggested here generalizes the so-called Weil homomorphism for superspace which lies on the basis of the Chern and Potryagin characteristic class theory. The theory can be extended to the global supermanifolds. (Atomindex citation 11:506222)

JINR-E-2-12363 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Superfield Approach to Anti de Sitter Supersymmetry.
E. A. Ivanov, and A. S. Sorin. 1979, 19p
U.S. Sales Only.

A self-contained superfield approach to global supersymmetry in anti de Sitter space (OSp(1.4)) is developed. General transformation laws for OSp(1.4)-superfields are established, and all basic elements of the OSp(1.4)-covariant formalism in the real basis, such as covariant superfield derivatives, invariant integration measure over the superspace OSp(1.4)/O(1.3), etc., are explicitly given. The reducibility questions are analyzed and realizations of OSp(1.4) in the left- and right-handed chiral superspaces are found. (Atomindex citation 11:506305)

JINR-E-4-12437 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
New Type of Real Weinberg Functions.
J. Bang, S. N. Ershov, and F. A. Gareev. 1979, 11p
U.S. Sales Only.

A possibility of introducing real Weinberg states is shown for arbitrary phase shifts. Expansions in these functions of K-matrices, Green functions, continuous spectrum wave functions are considered. A uniform convergence of expansions is best when a phase shift equals the phase shift of potential scattering. The results obtained are demonstrated using as an example the rectangular hole potential. (Atomindex citation 11:507315)

JINR-R-2-12359 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Soliton Interaction Dynamics in the Model of Complex Scalar Field with the Nonlinear Term of the Form J/sub mu / X J/Sup mu /.
V. E. Grishin, Yu. V. Katyshev, N. V. Makhaldiani, B. G. Makhan'kov, and A. B. Shvachka. 1979, 13p
In Russian.
U.S. Sales Only.

By computer experiment the charged soliton dynamics in the framework of the relativistically invariant Klein-Gordon equation with nonlinear term of the current x current form is investigated. Interaction types have been determined and the production of an additional soliton has been observed. (Atomindex citation 11:506289)

PB80-850431 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gravity Waves. July, 1973-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jul 73-May 80,
Howard L. Ogushwitz. Jul 80, 183p
NERACIAANT0243
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the properties, detection, and theory of quantum mechanical gravity waves. (Contains 200 citations.)

PB80-850449 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gravity Waves. September, 19 7-June, 1980 (Citations from the NTIS Data Base).
Rept. for Sep 7-Jun 80,
Howard L. Ogushwitz. Jul 80, 214p
NERACUSGNT0243
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the properties, detection, and theory of quantum mechanical gravity waves. (Contains 193 citations.)

PB80-850456 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gravity Waves. March, 1975-June, 1980 (Citations from the Energy Data Base).
Rept. for Mar 75-Jun 80,
Howard L. Ogushwitz. Jul 80, 189p
NERACEDBNT0243
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the properties, detection, and theory of quantum mechanical gravity waves. (Contains 200 citations.)

PB80-850464 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gravity Waves. January, 1969-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 69-Jun 80,
Howard L. Ogushwitz. Jul 80, 179p NERACEI NT0243
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the properties, detection, and theory of quantum mechanical gravity waves. (Contains 188 citations.)

20K. Solid Mechanics

AD-A087 952/8 PC **A02**/MF **A01**
Air Command and Staff Coll Maxwell AFB AL
The Free-Body Diagram Revisited.
Research rept.,
Michael T. Toole. May 80, 16p Rept no. ACSC-2500-80B

The purpose of this article is to review and hopefully revive interest in a procedure - the use of the free-body diagram - which is useful to students in an introductory mechanics course. This article provides a detailed discussion of the free-body diagram with examples and integrates the free-body diagram in to the problem-solving process. (Author)

AD-A088 030/2 PC **A04**/MF **A01**
Air Force Materials Lab Wright-Patterson AFB OH
Elastic Wave Propagation through Multilayered Media.
Final rept. 1 May-1 Oct 79,
Dale E. Chimenti, and Robert L. Crane. Mar 80, 70p Rept no. AFML-TR-79-4214

This report presents a review of the theory of elastic wave propagation in any number of fluid or solid layered media. Suitable wave equations are de-

rived, and boundary conditions determined by the nature of the media and the character of the interfaces are applied, yielding a formal solution for the transmitted and reflected, longitudinal and transverse wave potentials. Computer-generated graphs are presented which illustrate properties of the solutions in materials of interest in nondestructive evaluation. A tabulation of acoustic-velocity data for media commonly encountered in ultrasonic work is also included. (Author)

AD-A088 120/1 PC **A04**/MF **A01**
University of Southern California Los Angeles Dept of Materials Science
Optical and Mechanical Properties of Infrared Materials.
Final rept.,
Stephen M. Copley. Jul 80, 66p AFOSR-TR-80-0632
Contract F49620-78-C-0065

Optical and mechanical properties of various IR transmitting materials were investigated. Of special interest was the possibility of strengthening such materials through the formation of point defect complexes without increasing their IR absorption. A major facility for determining IR absorption was developed. The materials investigated include alkali halides, alkaline earth fluorides, Al-doped ZnSe and doped MgO. It was found that the hardness of ZnSe doped with al and CaF2 doped with Gd could be increased through thermal treatment, however, the identity of the point defect complex producing this hardening could not be determined. (Author)

AD-A088 200/1 PC **A04**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH
The Analysis and Design of Constrained Layer Damping Treatments.
Technical rept. Apr-Jun 80,
Peter J. Torvik. Jul 80, 65p Rept no. AFIT-TR-80-4

A tutorial work in which the mechanisms by which large shear strain may be induced in a damping layer are explored. The parameters of the system which determine the effectiveness of constrained layer treatments are identified from analyses of several geometric configurations. Advances of the past two decades in the design and analysis of damping layers as a means of controlling the amplitude of resonant vibrations are reviewed. (Author)

AD-A088 218/3 PC **A03**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
Green's Functions in Fracture Mechanics.
Technical rept.,
D. J. Cartwright, and D. P. Rooke. Mar 80, 40p RAE-TR-80035, DRIC-BR-74344
Presented at Conference on Fracture Mechanics: Current Status, Future Prospects, Cambridge (England), 16 Mar 79.

The use of Green's functions in the determination of stress intensity factors is described and applied to the solution of problems in fracture mechanics. Methods of obtaining further Green's functions from existing ones are presented. It is shown that several commonly used simple methods of determining stress intensity factors can be expressed in terms of approximate Green's functions. Many important Green's functions are presented and some of these are used to solve several problems of practical importance to the aerospace industry, eg cracks in stiffened sheets and cracks in pin-loaded lug-joints. (Author)

AD-A088 278/7 PC **A03**/MF **A01**
Materials Research Labs Ascot Vale (Australia)
A High-Sensitivity Potential-Drop Technique for Fatigue Crack Growth Measurements.
Graham Clark. Aug 79, 40p Rept no. MRL-R-755
Errata sheet inserted.

This report describes the design features of a highly sensitive and accurate system for monitoring the growth of fatigue cracks in laboratory specimens of various geometries. The system is based on the potential-drop method which utilizes the electrical resistance changes associated with fatigue crack growth through the specimen cross-section to detect crack length increments of a few micrometers. The technique is suitable for automation, and tests may be completed with a minimum amount of operator interference. A computer-based data-processing method is described, and the performance of the system in measuring both absolute crack length and crack growth rate is evaluated.

AD-A088 287/8 PC **A02**/MF **A01**
Washington Univ Seattle Dept of Mechanical Engineering
Dynamic Mixed Mode Fracture.
Interim rept.,
A. S. Kobayashi, and M. Ramulu. Aug 80, 15p
Rept no. TR-39
Contract N00014-76-C-0060

A newly developed data reduction process was used to reevaluate dynamic photoelastic results and to extract dynamic stress intensity factors, K(I)dyn and K(II)dyn, associated with curved and branched cracks in fracturing Homalite-100 plates. A branching stress intensity factor approximately 5 times the fracture toughness was identified for this material. Moderate to severe crack curvings were associated with a K(I)dyn and K(II)dyn ratio as low as 0.05, but with positive remote stress component, sigma (ox). (Author)

AD-A088 328/0 PC **A02**/MF **A01**
University Coll Cork (Ireland) Dept of Mathematical Physics
Recent Advances in the Edge-Function Method 1979-1980.
Final scientific rept. 2 Feb 79-1 Feb 80,
Patrick M. Quinlan. 30 Jul 80, 24p EOARD-TR-80-14
Grant AFOSR-79-0075

Main advances of E.F.M. in 1979-80 dealt with are: (1) Anisotropic thin plates, (2) Free Vibrations of thin plates, (3) Analysis of Bridge Slabs, (4) Elliptical Cracks in a Prismoidal body. Abstracts, conclusions, and illustrative examples are given in this report.

AD-A088 335/5 PC **A02**/MF **A01**
Queens Coll Flushing NY
Molecular Dynamic Shock Wave Studies in Solids - Fracture and Crack Propagation.
Final rept. 27 Sep 76-31 Jun 80,
Arthur Paskin. 31 Jun 80, 4p ARO-14444.2-E
Grants DAAG29-76-G-0337, DAAG29-77-G-0223

The earlier computer simulations of shock waves in solids was completed. An equation of state for shock waves in solids was developed and found to be an accurate description of shock wave properties. Computer simulation techniques were also used to study fracture and crack propagation in solids. The basic assumptions made in the usual continuum mechanics calculations were examined and found to be at best approximate. Some interesting results were found for rapidly applied stresses. (Author)

AD-A088 375/1 PC **A03**/MF **A01**
Texas Engineering Experiment Station College Station
A Survey of Current Temperature Dependent Elastic-Plastic-Creep Constitutive Laws for Applicability to Finite Element Computer Codes.
Interim rept.,
David H. Allen. 31 May 80, 41p Rept no. TEES-3275-80-2
Contract N00014-78-C-0150

The volume of the research effort currently under way to characterize the constitution of thermoelastic-plastic-creep materials is ample evidence of its importance. Although significant work has been done to obtain working constitutive models, in many cases the theory has not been cast with the remaining field equations into a working continuum model. In this paper, the author will consider models from classical plasticity and nonlinear viscoelasticity theory for applicability to the conservation of momentum. Based on physical accuracy as well as computational efficiency the author will assess the feasibilty of further development of each model. (Author)

AD-A088 497/3 PC **A02**/MF **A01**
Harvard Univ Cambridge MA Div of Applied Sciences
The Plastic Buckling of Long Cylindrical Shells under Pure Bending.
Slade Gellin. 10 May 79, 12p AFOSR-TR-80-0616
Grant AFOSR-77-3330
Pub. in International Jnl. of Solids Structures, v16 p397-407 1980.

No abstract available.

AD-A088 499/9 Not available NTIS
Army Research and Technology Labs Moffett Field CA
Reply by Author to Earl H. Dowell,
Dewey H. Hodges. 2 Jan 80, 2p
Availability: Pub. in AIAA Jnl. v18 n6 p735 Jun 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 509/5 PC **A03**/MF **A01**
Weidlinger Associates Menlo Park CA
Shock Spectra Design Methods for Equipment in Impulsively Loaded Structures.
Final rept. 1 Dec 78-1 Nov 79,
J. M. Kelly, and J. L. Sackman. 1 Nov 79, 34p R-7958, DNA-5267F, AD-E300 870
Contract DNA001-78-C-0388

An analytical method is developed whereby a simple estimate can be obtained of the maximum dynamic response of light equipment attached to a structure subjected to ground motion. The natural frequency of the equipment, modeled as a single-degree-of-freedom system, is considered to be close or equal to one of the natural frequencies of the N-degree-of-freedom structure. This estimate provides a convenient, rational basis for the structural design of the equipment and its installation. The approach is based on the transient analysis of lightly damped tuned or slightly nontuned equipment-structure systems in which the mass of the equipment is much smaller than that of the structure. It is assumed that the information available to the designer is a design spectrum for the ground motion, fixed-base modal properties of the structure, and fixed-base properties of the equipment. The results obtained are simple estimates of the maximum acceleration and displacement of the equipment. The method can also be used to treat closely-space modes in structural systems, where the square root of the sum of the squares procedure is known to be invalid. This analytical method is also applied to nontuned equipment-structure systems for which the conventional floor spectrum method is mathematically valid. A closed-form solution is obtained which permits an estimate of the maximum response of the equipment to be determined without the necessity to compute time histories as required by the floor spectrum method. (Author)

AD-A088 515/2 PC **A04**/MF **A01**
Washington Univ Seattle Dept of Aeronautics and Astronautics
A Void Growth Failure Criterion Applied to Dynamically and Statically Loaded Thin Rings.
Technical rept.,
A. M. Rajendran, and I. M. Fyfe. Jun 80, 55p 80-10, ARO-15078.1-E
Grant DAAG29-77-G-0211

The introduction of inertia terms in the theoretical model of thin ring expansion shows that classical plastic instability concepts, defined in terms of the local strain in the necking region, no longer apply. However, in this report it is shown that, when the plastically incompressible constitutive model is replaced with a model applicable to porous plastic materials, a criterion based on critical void volume fraction provides an alternative means to predict failure. The theory also provides a method in which both geometric and metallurgical imperfections in a given sample might be considered. The application of this theory to thin ring specimens was used to confirm that the critical void growth concept predicts the uniform strain at failure as observed in aluminum and copper rings, under both quasi-static and high strain-rate loading conditions. (Author)

N80-29762/5 PC **A24**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.

Finite-Strain Large-Deflection Elastic-Viscoplastic Finite-Element Transient Response Analysis of Structures.
J. J. A. Rodal, and E. A. Witmer. Jul 79, 567p
NASA-CR-159874, ASRL-TR-154-15
Contract NGR-22-009-339

A method of analysis for thin structures that incorporates finite strain, elastic-plastic, strain hardening, time dependent material behavior implemented with respect to a fixed configuration and is consistently valid for finite strains and finite rotations is developed. The theory is formulated systematically in a body fixed system of convected coordinates with materially embedded vectors that deform in common with continuum. Tensors are considered as linear vector functions and use is made of the dyadic representation. The kinematics of a deformable continuum is treated in detail, carefully defining precisely all quantities necessary for the analysis. The finite strain theory developed gives much better predictions and agreement with experiment than does the traditional small strain theory, and at practically no additional cost. This represents a very significant advance in the capability for the reliable prediction of nonlinear transient structural resposes, including the reliable prediction of strains large enough to produce ductile metal rupture.

N80-29779/9 PC **A07**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Statik und Dynamik.
Mechanical and Plastic Behavior in Case of Rupture Mechanik und Stoffverhalten bei Bruchvorgaengen.
J. H. Argyris, W. Aicher, J. Doltsinis, H. J. Ertelt, and G. Kierner. 1979, 141p ISD-257, ISSN-0170-6071
Contract DFG-AR-44/31
Text in German.

Analytical work on nonlinear rupture mechanics is presented. Experiments, techniques of measurement of extension, the measurement on a specimen with rupture, and the behavior of the material in case of stationary and nonstationary fracture extension are shown.

PB80-850969 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Structural Mechanics Software: NASTRAN. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jun 80, 59p
NERACIAANT0229
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe topics related to NASTRAN (NASA Structural Analysis). Topics include the application of NASTRAN to the space shuttle, motor component vibrations, Lockheed missiles, etc. (Contains 044 citations.)

PB80-850977 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Structural Mechanics Software: NASTRAN. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 39p NERACEI NT0229
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe topics related to NASTRAN (NASA Structural Analysis). Topics include the application of NASTRAN to the space shuttle, motor component vibrations, Lockheed missiles, etc. (Contains 032 citations.)

PB80-857774 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photoelasticity. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Lawrence H. Marcus. Jun 80, 121p
NERACIAANT0521
Sponsored in part by National Technical Information Service, Springfield, VA.

This report contains citations which deal with photoelastic methods, materials, and analysis. The application of photoelasticity to stress concentration, crack propagation, three dimensional, joint, and seismic analysis is covered. Dynamic, reflective, holographic, and computer analysis photoelasticity are included with specific applications to analysis of pressure vessels, beams, aircraft and automotive structures and engines. (Contains 109 citations.)

PB80-858418 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photoelasticity. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 198p
NERACUSGNT0521
Sponsored in part by National Technical Information Service, Springfield, VA.

This report contains citations which deal with photoelastic methods, materials and analysis. The application of photoelasticity to stress concentration, crack propagation, three dimensional, joint, and seismic analysis is covered. Dynamic, reflective, holographic, and computer analysis photoelasticity are included with specific applications to analysis of pressure vessels, beams, aircraft and automotive structures and engines. (Contains 200 citations.)

PB80-858426 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photoelasticity. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 87p
NERACEDBNT0521
Sponsored in part by National Technical Information Service, Springfield, VA.

This report contains citations which deal with photoelastic methods, materials and analysis. The application of photoelasticity to stress concentration, crack propagation, three dimensional, joint, and seismic analysis is covered. Dynamic, reflective, holographic, and computer analysis photoelasticity are included with specific applications to analysis of pressure vessels, beams, aircraft and automotive structures and engines. (Contains 079 citations.)

PB80-858665 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Photoelasticity. February, 1977-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Feb 77-Jun 80,
Lawrence H. Marcus. Jun 80, 193p NERACEI NT0521
Sponsored in part by National Technical Information Service, Springfield, VA.

This report contains citations which deal with photoelastic methods, materials and analysis. The application of photoelasticity to stress concentration, crack propagation, three dimensional, joint, and seismic analysis is covered. Dynamic, reflective, holographic, and computer analysis photoelasticity are included with specific applications to analysis of pressure vessels, beams, aircraft and automotive structures and engines. (Contains 200 citations.)

SAND-80-8225 PC **A06**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Users Manual for GNATS2 (A Finite Element Computer Program for the General Nonlinear Analysis of Two-Dimensional Structures).
M. L. Callabresi, and M. L. Chiesa. Jul 80, 107p
Contract AC04-76DP00789

GNATS is a system of three user-oriented finite element computer programs designed for the nonlinear analysis of axisymmetric and two-dimensional static structures. A preprocessor program, MESH2, provides the two-dimensional finite element mesh. The main program, GNATS, solves the nonlinear structural problem including the effects of large displacements, large strains, and elastic-plastic material behavior. A Lagrangian coordinate system is used in GNATS for describing the euilibrium configuration of the body. A post-processor program, GPRINT, prints the selected values of displacements, stresses, and strains. The input data required for using MESH2, GNATS, and GPRINT for a nonlinear structural analysis is described. Dynamic dimensions are used for all arrays in these programs. The maximum problem size, therefore, is limited only by the computer being used. 61 figures, 4 tables. (ERA citation 05:031323)

20L. Solid-State Physics

AD-A088 162/3 PC **A03**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Graphoepitaxy.
Semiannual technical summary rept. 1 Jan-30 Jun 79,
Henry I. Smith. 30 Jun 79, 29p ESD-TR-79-311
Contract F19628-78-C-0002, ARPA Order-3336

Graphoepitaxy of silicon films, 0.5 micron thick, has been achieved on amorphous fused silica substrates by laser crystallization of amorphous silicon deposited over surface-relief gratings etched into the substrates by reactive-ion etching. The gratings had a square-wave cross section with a 3.8 micron spatial period, a 100-mm depth, and corner radii of about 5 nm. The <100> directions in the silicon were parallel to the grating to within + or - 15 deg, and perpendicular to the substrate plane to within + or - 1.5 deg. A simple model for the graphoepitaxy process is presented. Sheet resistivity of phosphorus-doped graphoepitaxial silicon was 2.5 times larger than that of bulk silicon of the same doping. A technique is described for exposing patterns of spatial period p/n using near-field diffraction from masks of spatial period p. The technique, called 'spatial-period-division,' can be used with visible, UV or X-ray radiation. With soft X-rays, it is possible to produce gratings of much finer spatial period than can be achieved by current laser holographic methods. The feasibility of the technique was demonstrated at the 4.5-nm carbon K X-ray wavelength by 'doubling' a 196.8-nm-period grating-pattern X-ray mask to produce a 98.4-nm-period pattern in polymethyl methacrylate (PMMA). Exposure of higher spatial-frequency-multiples appears feasible. A new technique for fabricating high-contrast X-ray masks with precisely controlled linewidths is described. The technique is based on the deposition at an oblique angle ('shadowing') of X-ray absorber material onto relief structures of triangular or square cross section in a polyimide plastic membrane. (Author)

AD-A088 196/1 PC **A07**/MF **A01**
Harvard Univ Cambridge MA Div of Applied Sciences
Percolation and Electrical Conduction in Superconducting Composites.
Interim rept.,
Christopher J. Lobb. Aug 80, 128p Rept no. TR-16
Contracts N00014-77-C-0085, N00014-75-C-0648
Sponsored in part by Grants NSF-DMR77-24295, NSF-DMR79-04155 and NSF-DMR79-09011.

We report the experimental properties of a number of random superconducting-normal metal composites. Theoretical interpretation is also presented, with emphasis on the effects of geometrical randomness. The electrical properties of in situ multifilamentary Cu-V3Ga wires are discussed, with emphasis on critical current and field properties which are relevant to applications. We found that these wires had upper critical fields as high as 22.4T at 4.2K with a transition temperature of 15.5K. Their overall critical current density compared favorably with commercial wires. The results of electrical measurements on in situ Cu alloy-Nb composites are reported which elucidate the roles of percolation and the proximity effect in these materials. Our data show that the proximity effect is very important in clean, low superconducting concentration samples, with geometrical percolation being more important as the matrix becomes dirtier. In addi-

tion, we discuss models for the superconducting to normal transition in these materials which include the effects of randomness and thermal fluctuations. A two-dimensional thin film system based on Cu-Pb is discussed and shown to be qualitatively similar to the three-dimensional in situ composites.

AD-A088 262/1 MF **A01**
National Bureau of Standards Washington DC
Semiconductor Measurement Technology.
Progress rept. 1 Apr-30 Sep 77,
W. Murray Bullis. Aug 80, 47p Rept no. NBS-SP-400-45
ARPA Order-2397
Availability: Superintendent of Documents, GPO, Washington, DC 20402 PC $2.25. Microfiche furnished to DTIC (and NTIS) users.

This progress report describes NBS activities directed toward the development of methods of measurement for semiconductor materials, process control, and devices. Both in-house and contract efforts are included. The emphasis is on silicon device technologies. Principal accomplishments during this reporting period included (1) development of theoretical expressions for computing resistivity and hole mobility for boron-doped silicon; (2) completion of a study of problems associated with use of a scanning electron microscope for total dose testing of semiconductor devices; (3) completion of a pilot study to evaluate procedures for measuring 1- to 10-micrometer wide clear and opaque lines viewed with transmitted illumination; (4) completion of a preliminary study of test structures for estimating densities of process-induced random faults in device wafers; and (5) completion of an interlaboratory evaluation of the destructive wire-bond pull test. Also reported is other ongoing work on materials characterization by electrical and physical analysis methods, materials and procedures for wafer processing, photolithography, test patterns, and device inspection and test procedures. (Author)

AD-A088 423/9 PC **A02**/MF **A01**
Cornell Univ Ithaca NY Dept of Chemistry
A Study of Secondary Ion Triple Bond Analogues.
Interim technical rept.,
D. T. Hodul, W. C. Harris, and G. H. Morrison. 20 Aug 80, 18p Rept no. TR-1
Contract N00014-80-C-0538

Diatomic molecular ions isoelectronic with CN have been generated in ion implanted semiconductor materials and analyzed using secondary ion mass spectrometry (SIMS). Negative (IVA-VA) ions containing the VA species from IVA implanted IIIA-VA semiconductors are found to be produced more readily than the IVA ions. The triple bond analogues studied were of the general type (IVA-VA), (IIIA-VIA) (-), (VA-VIA) (+) and (IVA-VIIA). Molecular ion formation mechanisms and the analytical consequences of the results of this study are discussed. (Author)

AD-A088 446/0 PC **A02**/MF **A01**
Hughes Research Labs Malibu CA
Electronic Processes in InP and Related Compounds.
Quarterly progress rept. no. 3, 13 Mar-12 Jun 80,
K. V. Vaidyanathan, C. L. Anderson, H. L. Dunlap, D. E. Holmes, and G. S. Kamath. Jul 80, 10p
Contract N00019-79-C-0533

An experimental system to measure ionization coefficients in InP and related compounds is described. The current-voltage characteristics of Schottky barriers on p-type InP are presented. A set of masks designed to fabricate guarded Schottky diodes for making ionization coefficient measurements is described. (Author)

AD-A088 461/9 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
InP Surface Conducting Films from Electron-Pulse Annealing.
D. Eirug Davies, E. F. Kennedy, J. J. Comer, and J. P. Lorenzo. 9 Jan 80, 4p Rept no. RADC/ETR-80-0025
Pub. in Applied Physics Letters, v36 n11 p922-924, 1 Jun 80.

No abstract available.

AD-A088 493/2 PC **A02**/MF **A01**
Colorado Univ At Boulder Dept of Physics and Astrophysics
Ferroelectric Phase Transition in the Superionic Conductor Ag(26)I(18)W(4)O(16),
J. E. Scott, F. Habbal, and J. A. Zvirgzds. 1979, 6p AFOSR-TR-80-0615
Grant AFOSR-77-3105
Pub. in Jnl. of Chemical Physics, v72 n4 p2760-2762, 15 Feb 80.

No abstract available.

AERE-PR/MPD-6 PC **A06**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell.
Neutron Beam Studies.
B. T. M. Willis, and M. E. Apps. Jan 79, 108p
U.S. Sales Only.

The report is in sections, entitled: metallurgy; reactor fuels; defect solid state and interatomic forces; surface studies; colloid, polymer and biological studies; glasses; energy-related materials; solid state physics and crystallography; instrumentation and experimental technique. (Atomindex citation 10:472119)

BNL-27976 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Effects of Irradiation and Mechanical Stress on the Superconducting Properties of Candidate Magnet Conductors.
C. L. Snead, Jr., and T. Luhman. 1980, 60p
Contract AC02-76CH00016

The effects of radiation damage on the superconducting critical properties of candidate magnet materials are reviewed. Neutron, and charged-particle irradiation results are covered. The discussion is restricted to effects in NbTi and the A15-compound superconductors. The utility of these conductors in radiation fields is first explored by defining the magnitude of critical-property changes with the fluence of various irradiating particles. The physical mechanisms that couple the irradiation defects to the observed critical-property changes are discussed. Annealing/recovery data on irradiated materials are included where they pertain to the understanding of the physical mechanisms involved, and thereby to the desirability of magnet annealing in actual operating circumstances. (ERA citation 05:029440)

CONF-800567-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Evidence for Microstructural Effects under Strain in Bronze Process Nb sub 3 SN.
D. M. Kroeger, D. S. Easton, C. C. Koch, and A. DasGupta. 1980, 17p
Contract W-7405-ENG-26
International cryogenic materials conference, Upton, NY, USA, 28 May 1980.

The possible effects of externally applied strain on the flux pinning process can be divided into two groups according to whether the significant property changes produced by strain are associated with the crystalline defects which act as flux pinners, or with the bulk superconducting material which carries the supercurrent. The question of whether there is a microstructural component to the strain dependence of Fp by carefully determining whether the bulk property changes which occur can adequately account for all of the variation of Fp with strain. Examination of the results in light of current theories of flux pinning and type-II superconductivity indicates that bulk property changes do not account for all of the change in Fp, suggesting that microstructural effects are also important. (ERA citation 05:029851)

DOE/ER/01198-1315 PC **A07**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Physics.
Superconductivity and the Structural Phase Transitions in Palladium Hydride and Palladium Deuteride.
R. W. Standley. 1980, 132p
Contract AC02-76ER01198
Thesis.

The results of two experimental studies of the superconducting transition temperature, T/sub c/, of palladium hydride, PdH/sub x/, and palladium deuteride, PdD/sub x/, are presented. In the first study, the superconducting transition temperature of PdH/sub x/(D/sub x/) is studied as a function of H(D) concentration, x, in the temperature range from 0.2 K to 4K. The data join smoothly with those reported previously by Miller and Satterthwaite at higher temperatures, and the composite data are described by the empirical relation T/sub c/ = 150.8 (x-x/sub o/) exp 2 exp 244 , where x/sub o/ = 0.715 for hydride samples and 0.668 for deuteride samples. The results, when compared with the theoretical predictions of Klein and Papaconstantopoulos, et al., raise questions about the validity of their explanation of the reverse isotope effect, which is based solely on a difference in force constants. In the second study, the effect of the order-disorder structural transition associated with the 50 K anomaly on the superconductivity of PdH/sub x/(D/sub x/) is investigated. Samples were quenched to low temperatures in the disordered state, and their transition temperatures measured. The samples were then annealed just below the anomaly temperature, and the ordering process followed by monitoring the change in sample resistance. The transition temperatures in the ordered state were then measured. (ERA citation 05:029852)

DOE/ER/01198-1316 PC **A07**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Physics.
Electron Tunneling into Superconducting Indium and Lead Films Containing the Magnetic Impurity Manganese.
J. K. Tsang. 1980, 145p
Contract AC02-76ER01198
Thesis.

Tunneling measurements of quench-condensed In-Mn and Pb-Mn alloy films were made. The results were compared with Shiba's theory of superconductors containing magnetic impurities. The localized excited impurity states predicted by Shiba's theory were observed in both alloys. In addition to s-wave scattering, it was necessary to include p- and d-wave scattering of the conduction electrons in the theory in order to explain the experimental data. Partial agreement between the theory and the experimental data was obtained using phase shifts from band calculations by A.B. Kunz. The results on In-Mn also agree with thermal conductivity data. (ERA citation 05:029853)

IFIN-FT-159-1978 PC **A03**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Resonance Scattering of Rayleigh Waves by a Mass Defect.
M. Croitoru, and D. Grecu. Jun 78, 31p
U.S. Sales Only.

The resonance scattering of an incident Rayleigh wave by a mass defect extending over a small cylindrical region situated in the surface of a semi-infinite isotropic, elastic medium is investigated by means of the Green's function method. The form of the differential cross-section for the scattering into different channels exhibits a strong resonance phenomenon at two frequencies. The expression of the resonance frequencies as well as of the corresponding widths depends on the relative change in mass density. The main assumption that the wavelengths of incoming and scattered wave are large compared to the defect dimension implies a large relative mass-density change. (Atomindex citation 11:509501)

IFIN-FT-160-1978 PC **A03**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Spherical Limit of the n-Vector Model and Correlation Inequalities.
N. Angelescu, M. Bundaru, and G. Costache. Aug 78, 29p
U.S. Sales Only.

The asymptotics of the state of the n-vector model with a finite number of spins in the spherical limit is studied. Besides rederiving the limit free energy, corresponding to a generalized spherical model (with "spherical constraint" at every site), we obtain also the limit of the correlation functions, which allow a precise definition of the state of the latter model. Correlation inequalities are proved for ferromagnetic interactions in the asymptotic regime. In particular, it is shown that the general-

ized spherical model fulfills the expected Griffiths' type inequalities, differing in this respect from the spherical model with overall constraint. (Atomindex citation 11:509446)

IFTM-FT-151-1978 PC **A04**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Master Equation Approach to the Hopping Transport Theory.
L. Banyai, and A. Aldea. Mar 78, 51p
U.S. Sales Only.

We have tried to look systematically at all the assumptions and concepts that appear in hopping theory explicitly or implicitly. The guiding idea we followed was that about markovian processes, described by a Master equation, as well as a detailed analysis of the assumptions of the general transport theory. The exact results obtained in recent years on the proof of the Master equation indeed can indicate the physical domain of validity of some approximations, which in the usual Green function techniques remain unmotivated. The analysis of the basic transport-theoretical ideas was also necessary due to some delicate procedures that appear somewhat more important in the hopping problem, as well as to consider the intervening assumptions about the properties of the system. (Atomindex citation 11:509347)

IFTM-FT-152-1978 PC **A02**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Master Equation Approach to Hopping Conduction in the Presence of a Magnetic Field.
A. Aldea, and L. Banyai. Mar 78, 12p
U.S. Sales Only.

The transverse conductivity in a constant magnetic field is calculated for Holstein's hopping model using the Master equation approximation for the Kubo formula. (Atomindex citation 11:509343)

INIS-mf-5492 PC **A06**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Some Applications of Second Sound in Liquid Helium.
A. G. M. van der Boog. 12 Sep 79, 104p
Thesis.
U.S. Sales Only.

The creation of quantized vortices at a constriction between two parts of an apparatus filled with HeII is described. A number of experiments have been carried out, which were attemps (a) to observe the average rate at which vortices are created at the constriction, and (b) to observe vortex synchronisation (ac Josephson effect) by making use of second sound to modulate the flow in the constriction. The constriction was either a single orifice or a large number of parallel channels. The properties of dilute exp 3 He- exp 4 He mixtures in the temperature region 100 mK $<$ T $<$ 650mK and at exp 3 He molar concentrations in the region 0.173 x 10 exp -2 $<$ X $<$ 1.00 x 10 exp -2 are dealt with. A dilute exp 3 He- exp 4 He mixture can be described in terms of models based on the assumption that the excitations of this system behave like a weakly interacting gas. These excitations are both the exp 3 He quasiparticles and, as in pure exp 4 He, phonons and rotons. (Atomindex citation 11:507002)

JINR-R-8-12323 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Dependence of Differential Resistance on the Critical Current Taking into Account Sample Overheating.
I. N. Goncharov, G. L. Dorofeev, V. V. Pasyuk, and I. S. Khukhareva. 1979, 14p
In Russian.
U.S. Sales Only.

Voltage-current characteristics of the superconducting (Nb-(76-80%) Zr) cold-worked strip samples have been measured for different values of the temperature, magnetic field and the angle between the field direction and the sample plane. The critical current was changed by more than the order of magnitude. The voltage-current characteristics were calculated for different angles taking into account the integration overheating of samples and the hypothesis on the independence of differential resistance on the critical current. A good agreement of the experimental and calculated voltage-current characteristics shows evidence for the validity of the hypothesis (in this case the maximum pinning force is 5x10 exp 7 dyn/cm exp 3 at T=1.85 K). The problem of stability of the resistive state is considered connected with heat transfer to liquid helium. (Atomindex citation 11:509828)

KFK-2688 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung.
Relationship Between the Properties and the Microstructure of Multiphase Materials.
G. Ondracek. Aug 78, 6p
In German.
U.S. Sales Only.

The electrical resistivity,Young's modulus of elasticity and the thermal expansion coefficient of multiphase materials depend on their microstructure, that is, on the geometry and geometrical arrangement of their phases. The present contribution in four parts deals with the derivation and experimental confirmation of quantitative relationships between properties and microstructure. It is introduced by summarizing the state-of-the-art to the problem and considering the microstructure description quantitatively from data measured by quantitative microstructural analysis. The derivation of microstructure-property equations follows providing the interrelationship between the microstructure of two-phase materials including porous materials and their electrical resistivity, Young's modulus of elasticity and thermal expansion coefficient. Calculated properties are compared to those measured for two phase materials including porous materials. (Atomindex citation 11:506611)

KFK-2854 PC **A05**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
Thermoelectric Potential in UO sub 2 and (U,Pu)O sub 2 and its Influence on Oxygen Migration in Presence of a Temperature Gradient.
F. D'Annucci. Sep 79, 85p EUR-6403
In German.Thesis.
U.S. Sales Only.

Measurement of the thermoelectric power have been carried out in sintered pellets of uranium-oxide and uranium-plutonium mixed oxides up to 1800 exp 0 K. For the thermal treatment an inducting furnace is used. The temperatures and the thermoelectric potential are measured with two thermocouples wich are contained in two holes in the lower end of the pellet. During the experiments a temperature difference of 80 exp 0 K is maintained between the two measuring points. The Seebeck coefficients are calculated from the EMF measurements as a function of temperature and of the O/M ratio. The results show that these oxides have the typical electric properties of a classic semiconductor. The conductivity is of p-type up to a defined temperature wich is a function of the stoichiometry. The Seebeck coefficients are characterized by a defined energy of activation wich is independent from the stochiometry in the regions of hypo- and hyperstochiometric oxides. The thermoelectric forces and the lattice forces drive ions along the temperature gradients. Both forces can be described by the heat of transport of oxygen ions wich contains a thermoelectric and a thermal part. The thermoelectric part of the heat of transport is calculated with the values of the Seebeck coefficients and the contribution to the total heat of transport is discussed. (Atomindex citation 11:506551)

KFK-2879 PC **A06**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Technische Physik.
Behaviour of BCC Technical Superconductors under Dynamic Mechanical Stress.
G. Pasztor. Oct 79, 101p
In German.Thesis.
U.S. Sales Only.

The behavior of bcc technical superconductors NbTi, NbZr and Nb under dynamic mechanical stress was investigated using two measuring techniques. In shot-sample training experiments the load was measured at which, in wire samples with a transport current applied, normal transitions occurred in successive straining cycles. In addition, the acoustic emission from superconductors was monitored during strain at 4.2 K. A mechanism based on the formation of a stress-induced shear transformation was proposed to account for the training behavior. This partially reversible shearing of the lattice is not sufficient to furnish the required energy for transition in the normal state, but it may be detected by means of acoustic emission. On the other hand, a time correlation between acoustic emission and normal transition was found although training behavior and emission responded differently to the same metallurgical treatment. The experiments strongly indicate that the mechanism directly responsible for local energy release is microyielding, induced by the shear transformation. The stress relaxation which accompanies this transformation results in an increased load on the rest of the sample cross-section. Consequently microyielding caused by the transformation could occur in that region of the sample without being detected on the stress-strain curve. This condition would result in a sufficient release of energy to increase the sample temperature above its critical value. (Atomindex citation 11:509830)

LBL-10977 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Construction and Testing of a Double Acting Bellows Liquid Helium Pump.
W. A. Burns, M. A. Green, R. R. Ross, and H. Van Slyke. May 80, 8p CONF-800631-6
Contract W-7405-ENG-48
International cryogenic engineering conference, Genoa, Italy, 3 Jun 1980.

The double acting reciprocating bellows liquid helium pump built and tested at the Lawrence Berkeley Laboratory is described. The pump is capable of delivering 50 gs exp -1 of liquid helium to supply the two-phase cooling sytem for a large superconducting magnet. The pump is driven by a torque motor at room temperature; the reciprocating motion is transmitted to the pump through a shaft which operates between room temperature and 4 exp 0 K. The design details of this liquid helium pump are presented. The helium pump has operated in a helium bath and in pumped forced flow helium circuits. The results of these experimental tests are presented in this report. (ERA citation 05:029441)

PB80-227655 Not available NTIS
National Bureau of Standards, Washington, DC.
Neutron Scattering Studies of Magnetic Superconductors.
Final rept.,
J. W. Lynn, and R. N. Shelton. 1980, 2p
Sponsored in part by National Science Foundation, Washington, DC., and Department of Energy, Washington, DC.
Pub. in Jnl. of Magn. Magn. Mater. 15-18, p1577-1578 1980.

Measurements have been carried out on a series of rare earth Chevrel-phase superconductors. In the selenide materials well defined crystal field transitions have been observed, which can be understood to a first approximation on the basis of a cubic crystal field with a magnetic ground state. In HoMo6S8, on the other hand, no crystal field excitations have been observed over a wide range of energies. Diffraction data show that essentially the full free-ion moment is readily induced in HoMo6S8, but that in ErMo6Se8 less than half the free-ion moment is induced. The induced-moment data on HoMo6S8 can be readily interpreted on the basis of one Ho atom per unit cell, whereas for ErMo6Se8 this appears not to be the case. These data also demonstrate that the only significant magnetic impurity phases in these samples are (RE)2O2Se, and these are typically a few percent or less in volume.

PB80-850290 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Polycrystalline Silicon. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jul 80, 75p
NERACIAANT0235

Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the use and application of polycrystalline silicon. Abstracts include a discussion of polycrystalline silicon solar cells and their production. (Contains 074 citations.)

PB80-850308 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Polycrystalline Silicon. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jul 80, 140p
NERACEDBNT0235
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the use and application of polycrystalline silicon. Abstracts include a discussion of polycrystalline silicon solar cells and their production. (Contains 115 citations.)

PB80-850316 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Polycrystalline Silicon. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Aug 80, 123p NERACEI NT0235
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the use and application of polycrystalline silicon. Abstracts include a discussion of polycrystalline silicon solar cells and their production. (Contains 116 citations.)

PB80-854490 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magneto-Optic Effect. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 114p NERACUSGNT0820
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the magneto-optic effect in various chemical compounds, materials, and plasmas used in a wide variety of applications are cited in this retrospective bibliography. Magneto-optic effects on electromagnetic wave propagation in these media are included. (Contains 103 citations.)

PB80-854805 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrical Point Contacts. July, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jul 76-May 80,
William V. Sassi. Jun 80, 42p
NERACEDBNT0869
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover theoretical and experimental investigations of properties of superconducting point contacts and the subharmonic structure of the currentvoltage characteristics of superconducting point contacts in an external microwave field. Temperature dependence of the critical current of contacts, and the observed dependence of the contact characteristic voltage, and measurements on point contacts are also discussed. (Contains 074 citations.)

PB80-856396 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Properties of Semiconductors. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 122p NERACUSGNT1082
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the magnetic properties of a wide variety of semiconductor materials are included in this retrospective bibliography. (Contains 107 citations.)

PB80-856404 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Properties of Semiconductors. December, 1973-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Dec 73-Jun 80,
John H. Frey. Jun 80, 190p NERACEI NT1082
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the magnetic properties of a wide variety of semiconductor materials are included in this retrospective bibliography. (Contains 200 citations.)

PB80-856412 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Properties of Superconductors. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 164p NERACUSGNT1083
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the magnetic properties of superconductors including materials, magnets, and some theoretical considerations, are cited in this retrospective bibliography. (Contains 153 citations.)

PB80-856420 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Properties of Superconductors. December, 1973-May, 1980 (Citations from the Energy Data Base).
Rept. for Dec 73-May 80,
John H. Frey. Jun 80, 189p NERACEDBNT1083
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the magnetic properties of superconductors including materials, magnets, and some theoretical considerations, are cited in this retrospective bibliography. (Contains 200 citations.)

PB80-856438 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Properties of Superconductors. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 127p NERACEI NT1083
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the magnetic properties of superconductors including materials, magnets, and some theoretical considerations, are cited in this retrospective bibliography. (Contains 131 citations.)

PB80-856446 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Properties of Superconductors. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
John H. Frey. Jun 80, 75p NERACIAANT1083
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the magnetic properties of superconductors including materials, magnets, and some theoretical considerations, are cited in this retrospective bibliography. (Contains 071 citations.)

PB80-856776 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Polycrystalline Silicon. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Aug 80, 90p
NERACUSGNT0235
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography describe the use and application of polycrystalline silicon. Abstracts include a discussion of polycrystalline silicon solar cells, and their production. (Contains 066 citations.)

PB80-857683 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Susceptibility. May, 1973-June, 1980 (Citations from the NTIS Data Base).
Rept. for May 73-Jun 80,
John H. Frey. Jun 80, 107p NERACUSGNT0818
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the magnetic susceptibility of alloys, metal complexes, compounds, and various other materials are cited in this retrospective bibliography. (Contains 190 citations.)

PB80-857691 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Susceptibility. May, 1979-May, 1980 (Citations from the Energy Data Base).
Rept. for May 79-May 80,
John H. Frey. Jun 80, 202p NERACEDBNT0818
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the magnetic susceptibility of alloys, metal complexes, compounds, and various other materials are cited in this retrospective bibliography. (Contains 152 citations.)

PB80-857709 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Susceptibility. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 164p NERACEI NT0818
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the magnetic susceptibility of alloys, metal complexes, compounds, and various other materials are cited in this retrospective bibliography. (Contains 176 citations.)

PB80-857857 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Permeability. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 148p NERACUSGNT0809
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the analysis, calculation, and utilization of magnetic permeability in alloys and ferric materials. Citations include descriptions of anisotropic permeability, field analysis, loss calculation, laminated magnetic steel parts for electric transformers, flux patterns, resonance and relaxation components, and electric resistivity. (Contains 132 citations.)

PB80-857865 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Permeability. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 98p NERACEI NT0809
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the analysis, calculation, and utilization of magnetic permeability in alloys and ferric materials. Citations include descriptions of anisotropic permeability, field analysis, loss calculation, laminated magnetic steel parts for electric transformers, flux patterns, resonance and relaxation components, and electric resistivity. (Contains 073 citations.)

PB80-857873 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.

Magnetic Permeability. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
John H. Frey. Jun 80, 141p NERACIAANT0809
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from worldwide sources are cited concerning the analysis, calculation, and utilization of magnetic permeability in alloys and ferric materials. Citations include descriptions of anisotropic permeability, field analysis, loss calculation, laminated magnetic steel parts for electric transformers, flux patterns, resonance and relaxation components, and electric resistivity. (Contains 130 citations.)

UCRL-84040 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Mechanical Properties of High-Current Multifilamentary Nb sub 3 SN Conductors.
R. M. Scanlan, R. W. Hoard, D. N. Cornish, and J. P. Zbasnik. 23 May 80, 13p CONF-800587-1
Contract W-7405-ENG-48
International cryogenic materials conference, Upton, NY, USA, 28 May 1980.

Nb sub 3 Sn is a strain-sensitive superconductor which exhibits large changes in properties for strains of less than 1 percent. The critical current density at 12 T undergoes a reversible degradation of a factor of two for compressive strains of about 1 percent and undergoes an irreversible degradation for tensile strains on the Nb sub 3 Sn greater than 0.2 percent. Consequently, the successful application of Nb sub 3 Sn in large high-field magnets requires a complete understanding of the mechanical properties of the conductor. One conductor which is being used for many applications consists of filaments of Nb sub 3 Sn in a bronze matrix, and much progress has been made in understanding the mechanical behavior of this composite. The Nb sub 3 Sn filaments are placed in compression due to the differential thermal contraction between Nb sub 3 Sn and bronze which occurs when the composite is cooled from the Nb sub 3 Sn formation temperature (typically 700 exp 0 C) to the 4.2 exp 0 K operating temperature. The general behavior of the critical current when this conductor is subjected to a tensile stress is an increase to a maximum when the compressive strain on the Nb sub 3 Sn is relieved, followed by a decrease as the Nb sub 3 Sn filaments are placed in tension. The degree of precompression is controlled largely by the ratio of bronze to Nb sub 3 Sn in the conductor. (ERA citation 05:029299)

20N. Wave Propagation

AD-A088 090/6 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Experimental Measurements of Ambient Electromagnetic Noise from 1.0 to 4.0 kHz.
Final rept.,
Robert J. Dirger, William D. Meyers, and John R. Davis. 31 Jul 80, 64p Rept no. NRL-8413

The spectral noise density, amplitude probability distribution (APD), and spectral content of ambient noise from 1.0 to 4.0 kHz were measured. Analysis of the recorded data included detailed investigation of the diurnal variation of the noise, comparison of the APDs with two atmospheric noise models, time-domain excision of noise impulses to assess the reduction in noise achievable by nonlinear processing, investigation of broadband ionospheric emissions identified as polar chorus, and determination of the statistical variation (in frequency) of the spectral minimum near 3 kHz. The analysis of the diurnal variation suggested the existence of a large propagation anisotropy in the nighttime earthionosphere waveguide at 3 kHz, with east-to-west attenuation significantly lower than north-south attentuation. The observed seasonal and geographical averaged diurnal variations can be interpreted qualitatively in terms of worldwide thunderstorm distributions and day-night changes in the reflecting height of the ionospheric D-layer. The measured spectral noise density values are significantly lower than values measured under similar conditions by earlier investigations; the lower values are attributed to the use of a receiver with a lower intrinsic noise and careful site selection to avoid man-made interference. The recorded APDs varied from a Rayleigh form during low noise periods in Norway to a distribtution with a tail at low exceedence values during higher noise periods in both Norway and Italy. Comparison of the APDs with the Field-Lewenstein model and the Middleton model generally showed satisfactory agreement.

AD-A088 170/6 PC **A03**/MF **A01**
Megatek Corp San Diego CA
Satellite Sensing of the Solar - Terrestrial Environment and Real-Time Radio Propagation Forecasting. Lessons Learned from PROPHET. Volume I. Executive Summary.
Final rept. 1972-1979,
R. B. Rose, and P. H. Levine. 30 Sep 79, 50p
NOSC-TR-487-VOL-1
Contract N00123-78-C-0043

PROPHET denotes a class of radio propagation forecast terminals which represent the culmination of an 11-year development effort at the Naval Ocean Systems Center (NOSC) under the SOLRAD satellite program. The system is unique in that it provides a real-time link between Navy operations personnel and a worldwide network of ground-based and satellite-borne solar-terrestrial environment monitors. This link is used to generate - via distributed data processing - electromagnetic system performance predictions in formats specially tailored to meet the operational requirements of the user. An initial implementation of PROPHET has provided - over a 3-year period - highly successful hf frequency/antenna management support to the Technical Control Facility of the Naval Communication Station at Stockton, CA. This executive summary provides a concise overview of the evolution, structure, function, and accomplishments of PROPHET, together with recommendations for ways in which the PROPHET technology can be applied to recognized operational requirements fo the Navy. Technical details are elaborated in volume II. (Author)

AD-A088 198/7 PC **A04**/MF **A01**
Northrop Corporate Labs Pasadena CA
Application of the Singularity Expansion Method to Scattering From Imperfectly Conducting Bodies and Perfectly Conducting Bodies Within a Parallel Plate Region.
Interaction notes,
Lennart Marin. Jun 72, 55p Rept no. NOTE-116

This note is a continuation of previous work on the singularity expansion method. Different integral-equation formulations describing electromagnetic scattering from imperfectly conducting bodies are considered. A set of volume surface integral equations is used to determine the analytical properties in the complex frequency plane of the field scattered from imperfectly conducting, finite bodies. Conditions are determined for the constitutive parameters of the scattering body so that the scattered field can be described only by damped sinusoidal oscillations when the incident field is a delta function plane wave. Scattering from a perfectly conducting, finite body within a parallel plate region is also considered. It is shown that the singularities in the complex frequency plane of the scattered field are poles and branch cuts. The locations of the branch cuts depend only on the separation between the parallel plates. (Author)

AD-A088 275/3 PC **A03**/MF **A01**
Naval Research Lab Washington DC
The Microwave Applications Theory Program at NRL and Some Chemistry Code Applications to Ionospheric Heating by Microwave Radiation.
Memorandum rept.,
A. W. Ali. 26 Aug 80, 35p Rept no. NRL-MR-4302

A brief outline of the Microwave Applications program at NRL is presented. The goal of the program is to develop comprehensive codes for microwave air breakdown and microwave interaction with matter which can easily be applied for a wide range of applications. Also presented are results of microwave energy deposition in the ionosphere using the NRL Master Code for the disturbed E and F regions. Time histories of oxygen metastable states are presented for several levels of microwave power. From these, emission at 5577 A and 6300 A can be obtained. (Author)

AD-A088 332/2 PC **A03**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
The Evaluaton of Models for Atmospheric Attenuation and Backscatter Characteristic Estimation at 95 GHz.
Technical rept.,
Robert K. Crane, and Hsiao-hua K. Burke. Feb 78, 37p ESD-TR-80-84
Contract F19628-78-C-0002
Prepared in cooperation with Environmental Research and Technology, Inc., Concord, MA. Rept. no. ERT-P-3606.

Active or passive observations of targets on the surface of the earth at a frequency of 95 GHz may be adversely affected by the presence of rain or cloud along the observation path, in the vicinity of the target, or above the target. The effects of rain or cloud on system performance may be simulated given the characterstics of the system and models for attenuation and scattering by the rain or cloud particles. The validity of the simulation results depends upon the veracity of the rain or cloud model. In this brief report, models for attenuation and scattering by rain are reviewed and compared with experimental observations. Models for the calcualtion of attenuation due to clouds and the clear atmosphere are also presented. Calculations of the scattering properties of rain drops have been made many times over the past four decades. The results of these calculations have been used to model attenuation effects for radar and communication systems and to calibrate weather radar systems for use in measuring rainfall. The adequacy of the calculations for the estimation of attenuation over a wide frequency range has received considerable attention. (Author)

AD-A088 444/5 PC **A03**/MF **A01**
Max-Planck-Inst Fuer Aeronomie Lindau-Ueber-Northeim (Germany F R)
High Altitude Atmospheric Investigations. Part I. Results of Ground-Based Radio Wave Absorption Measurements Performed between 1968 and 1976 in South-West-Europe (Spain): Phenomenology.
Final rept. 1 Aug 75-1 Aug 80,
Hans-Ulrich Widdel. 31 May 80, 48p Rept no. MPAE-W-100-80-09
Grant DA-ERO-75-G-076

Results of A3 absorption measurements performed in southern Spain between 1968 and 1976 are communicated. Some details of the experimental set up are described. The discussion is mainly confined to the shape of the diurnal variations. It turns out that this parameter has a distinct physical meaning which changes with season. The result suggests that this is caused by meteorological effects in the neutral atmosphere. Some examples which point into this direction are communicated. (Author)

EUR-CEA-FC-937 PC **A05**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
High Frequency Energy Generation Through the Interaction of a Helical Beam with the Azimuthal Electric Field of a Resonating Structure.
R. Le Gardeur. Oct 77, 94p
In French.
U.S. Sales Only.

High frequency energy production from cyclotron electrons orbiting in a steady state magnetic field was studied, the major difficulties being the proper phasing of the electrons, necessary for the generation of the energy, and the perturbation caused by space charge, due to the presence of the electrons in the beam. Nevertheless, as the oscillating electric field present in the resonant cavity, field interacting with the electron beam consisting of cyclotron orbiting electrons, is azimuthal, the amplitude of the field rising with the distance from the axis of the electromagnetic cavity, the phasing of the electrons, permitting high frequency energy generation, is facilitated. A description is given of the physical mechanism resulting in the generation

of high frequency energy, followed by a detailed theoretical development, without consideration of the perturbations caused by space charge, due to the electrons present in the beam, and, eventually, by the relativistic change in mass (subjects treated in a second part of this report). At long wave lengths, a pseudo-cavity, whose dimensions are less than the wave length of the generated energy, permits, by employing the same physical mechanism as described above, the production of energy in the decimetric and metric wave bands. (Atomindex citation 10:431571)

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A088 212/6 PC **A03**/MF **A01**
Indiana Univ At Bloomington Dept of Chemistry
Reduction of Spectral Interferences in Flame Emission Spectrometry by Selective Spectral-Line Modulation.
Interim technical rept.,
S. W. Downey, J. G. Shabushnig, and G. M. Hieftje. 18 Jul 80, 27p Rept nos. TR-27, 34
Contract N00014-76-C-0838

Spectral interferences in flame emission spectrometry have been significantly reduced through the use of selective spectral-line modulation (SLM). In this method, a mirrored, rotating chopper is used to direct the emission from a sample flame alternately through and around a second (modulating) flame; selective modulation is achieved when the modulating flame contains absorbing atoms identical to emitting analyte atoms in the sample flame. In this paper, the effect of optical configuration and modulating conditions on working curve slope, linearity and signal-to-noise ratio is examined. Also, the ability of SLM to minimize broadband and narrow-line spectral interferences is demonstrated. In particular, it has been shown that the interference of the 550 nm CaOH band on barium determinations can be largely overcome. Also, interference of several Pd lines on Ni in the 350 nm region can be reduced by SLM. Finally, it is shown how the interference of flame background itself can be restricted in SLM procedures. (Author)

AD-A088 496/5 PC **A02**/MF **A01**
National Bureau of Standards Washington DC National Engineering Lab
Ignition of a Liquid Fuel Under High Intensity Radiation,
Takashi Kashiwagi. 16 Aug 79, 11p AFOSR-TR-80-0617
Grant AFOSR-ISSA-78-0002
Pub. in Combustion Science and Technology, v21 p131-139 1980.

No abstract available.

ANL-CT-78-4 PC **A08**/MF **A01**
Argonne National Lab., IL.
Numerical Modeling of Fluidized-Bed Combustor.
W. T. Sha, and S. L. Soo. Nov 77, 160p
Contract W-31-109-ENG-38

Optimum design of fluidized-bed combustor requires high carbon burn-up, good sulfur retention, minimized sorbent (Ca) utilization, efficient feed distribution and mechanical layout. These parameters are strongly affected by the dynamics of the fluidized bed. The dynamic behavior of fluidized combustor is formulated in terms of multidomain - multiphase mechanics. Fluidization, bubble mechanics, coal combustion, sorbent sulfation, oxidation, solids movement and elutriation, and heat transfer are explicitly taken into account in the proposed numerical model. The model solves conservation equations of mass, momentum and energy coupled with chemical reactions as boundary value problem in space and initial value problem in time. Multi-fluid model and modified implicit multifield numerical scheme are employed. The objective of this numerical model is for use in engineering design and scaling. Progress to date shows that all necessary relations can be incorporated within the framework of an overall multidomain - multiphase model for deterministic computation. Provisions are made for subsequent refinements of submodels of individual mechanism and improvements of the existing numerical model. These refinements and improvements can be achieved as better understanding of physical phenomena and more experimental data become available. The numerical model outlined in this report is specifically designed for the fluidized-bed combustor; however, it can readily be extended to various coal gasification systems. (ERA citation 05:031078)

DOE/ET/13011-10 PC **A02**/MF **A01**
Management and Technical Services Co., Philadelphia, PA.
700, 100, and 20 HP Combustion Test Facility Yearly Activity Report for the Period April 1, 1979 to April 1, 1980.
1980, 15p
Contract AC02-78ET13011

Management and Technical Services Co./ General Electric was awarded the contract to operate, modify and maintain the DOE/PETC 700 hp, 100 hp, and 20 hp Combustion Test Facility. These facilities were designed and built by the Department of Energy at Pittsburgh Energy Technology Center and its ultimate success is the responsibility of DOE/PETC. MATSCO/GE will provide support to assist in the goal of successful operation of this pilot plant facility. The primary objective of the DOE/PETC 700 hp and 100 hp CTF is to establish the practicality of coal oil slurry combustion as a technically, economically and environmentally feasible retrofit technology. The 20 hp CTF is to provide a test bed to evaluate synthetic fuels for its technical feasibility and its effect on the environment. Four series of combustion tests were completed. Coal-oil mixes for all tests were number 6 fuel oil and Pittsburgh Seam Coal. The tests were executed successfully. Operational problems were handled as required without excessive delay of the testing program. Additional studies performed concurrently with the combustion testing included flame studies, stack emissions studies during all tests, standard measurements of equipment wear after each test series and extensive erosion and corrosion analyses of boiler test coupons and the burner section of the fuel train after the 500 h endurance test. Testing activity and required facility modifications were coordinated through Department of Energy personnel. (ERA citation 05:030160)

EPRI-CS-1449(App.1) PC **A05**/MF **A01**
National Coal Board, Stoke Orchard (England). Coal Research Establishment.
Materials Problems in Fluidized-Bed Combustion Systems. Appendix 1. Description of Tests and Plant Performance Data. Final Report.
May 80, 83p

Appendix 1 describes the fluidised bed combustion test facility at the National Coal Board, Coal Research Establishment. This facility was used for two 1000 h investigations into the corrosion performance of boiler and gas turbine alloys under the Electric Power Research Institute Contract Ref. 388-1 with Combustion Systems Ltd., UK. Operating procedures, sampling methods and the test conditions are outlined. Detailed mass balances, temperatures, gas, ash, and dust analyses are provided. No conclusions are drawn from the data provided; such conclusions appear in the main report. Appendix 1 does not contain any metallographic data or information on the materials tested; this information appears in Appendix 2. (ERA citation 05:030162)

EPRI-CS-1449(App.2) PC **A14**/MF **A01**
National Coal Board, Stoke Orchard (England). Coal Research Establishment.
Materials Problems in Fluidized-Bed Combustion Systems. Appendix 2. Test Specimen Preparation, Handling, and Posttest Evaluation. Final Report.
E. A. Rogers, J. C. Holder, A. J. Minchener, A. J. Page, and R. D. La Nauze. May 80, 320p

Appendix 2 presents the metallographic data compiled by the National Coal Board, Coal Research Establishment, on materials tested for the Electric Power Research Institute Contract R P 388-1 with Combustion Systems Ltd., UK. Two 1000 h tests were carried out to investigate the corrosion performance of boiler and gas turbine alloys exposed in and above a fluidised bed coal combustor. Details are given of the preparation, handling, and examination procedures. Results of metallographic examination and chemical analyses on the samples examined by CRE are provided. This appendix does not attempt to draw any conclusions from the data: such conclusions appear in the main report. Description of the tests and plant performance data are given in Appendix 1 of this report. (ERA citation 05:030163)

FE-2471-T3 PC **A02**/MF **A01**
Exxon Research and Engineering Co., Florham Park, NJ.
Industrial Application Fluidized Bed Combustion: Category III. Indirect Fired Heaters. Quarterly Technical Report No. 13, July 1-September 30, 1979.
1979, 23p
Contract EX-76-C-01-2471

A program is underway to evaluate the technical and economic potential for the application of fluidized bed combustion to refinery and petrochemical plant indirect fired process heaters. A Process Stream Coking Test Unit has been used to study the parameters affecting coke laydown on the internal surfaces of hydrocarbon containing tubes under conditions of high temperature and heat transfer rate. The data analysis shows that in addition to film temperature, mass velocity is an important parameter in controlling coking rate. No coke laydown occurred in any tests run at a mass velocity of 600 lb/sec ft exp 2 at heat fluxes up to 60,000 Btu/h ft exp 2 . Construction of the High Temperature Heat Flux Test Unit has been completed and testing has begun. The operation of the Heat Flux Unit and the range of data collected is described. The object of the Economic and Applications Task of the Program is to evaluate the economic and logistic factors that might influence the schedule and circumstances under which coal fired Atmospheric Fluidized Bed Combustion (AFBC) technology might be applied to petroleum and petrochemical plant process heaters. The first phase, the Applications Phase, as been completed. The Economic Assessment is now underway. If these assessments plus the technical data obtained in the laboratory R and D phase of the program indicate favorable commercial potential, the program will be advanced to the demonstration phase. (ERA citation 05:030164)

FE-2689-T3 PC **A02**/MF **A01**
Germantown Labs., Inc., Philadelphia, PA.
Investigation of Fuels Containing Coal-Oil-Water Emulsions Fire Tube Test Apparatus Design and Construction. Seventh Quarterly Report, April 1-June 30, 1979.
N. H. Cherry, and C. S. Stokes. Jul 79, 16p
Contract EF-77-C-01-2689

The design and construction of a fire tube test apparatus for the burning of coal-oil-water emulsions is in progress. The unit is instrumented as to temperatures and flows along with a stack gas analyzer. A detailed description of equipment as well as the results o: coal particle size distribution studies is presented. (ERA citation 05:030165)

N80-29863/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Gas Phase Oxidation Downstream of a Catalytic Combustor.
J. S. Tien, and D. N. Anderson. 1979, 13p NASA-TM-81551, DOE/NASA/1040-16
Contract EC-77-A-31-1040

Presented at 13TH Middle Atlantic Regional Meeting of the ACS, West Long Branch, N.J., 19-23 Mar. 1979.

Effect of the length available for gas-phase reactions downstream of the catalytic reactor on the emission of CO and unburned hydrocarbons was investigated. A premixed, prevaporized propane/air feed to a 12/cm/diameter catalytic/reactor test section was used. The catalytic reactor was made of four 2.5 cm long monolithic catalyst elements. Four water cooled gas sampling probes were located at positions between 0 and 22 cm downstream of the catalytic reactor. Measurements of unburned hydrocarbon, CO, and CO2 were made. Tests were performed with an inlet air temperature of 800 K, a reference velocity of 10 m/s, pressures of 3 and 600,000 Pa, and fuel air equivalence ratios of 0.14 to 0.24. For very lean mixtures, hydrocarbon emissions were high and CO continued to be formed downstream of the catalytic reactor. At the highest equivalence ratios tested, hydrocarbon levels were much lower and CO was oxidized to CO2 in the gas phase downstream. To achieve acceptable emissions, a downstream region several times longer than the catalytic reactor could be required.

PB80-218969 PC **A04**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
A Theoretical Analysis of Nitric Oxide Production in a Methane/Air Turbulent Diffusion Flame.
Final rept. Jan 78-Apr 79,
Frank E. Marble, and James E. Broadwell. Jan 80, 72p EPA-600/7-80-018
Contract EPA-68-02-2613
Prepared in cooperation with California Inst. of Tech., Pasadena.

The report gives results of a theoretical analysis of nitric oxide production in a methane/air turbulent diffusion flame. In the coherent flame model used, the chemical reactions take place in laminar flame elements which are lengthened by the turbulent fluid motion and shortened when adjacent flame segments consume intervening reactant. The rates with which methane and air are consumed and nitric oxide generated in the strained laminar flame are computed numerically in an independent calculation. The model predicts nitric oxide levels of approximately 80 ppm at the end of the flame generated by a 30.5 cm (1 ft) diameter jet of methane issuing at 3050 cm/sec (100 ft/sec). This level varies directly with the fuel jet diameter and inversely with the jet velocity. A possibly important nitric oxide production mechanism, neglected in the analysis, can be treated in a proposed extension to the model.

PB80-228026 PC **A06**/MF **A01**
Battelle Columbus Labs., OH.
Assessment of the Effects of Electrostatic Field Interactions on Gas Combustion.
Final rept.,
E. L. Merryman, A. A. Putnam, R. B. Reif, and A. Levy. 20 Jun 80, 118p GRI-79/0063
Contract GRI-5014-361-0165

It is the purpose of this report to survey the current literature concerning the effects of electrostatic fields on gas combustion, and to assess the reported work for applicability in improving utilization efficiencies, e.g., by improving heat transfer and in reducing pollutant emissions.

SAND-79-8831 PC **A02**/MF **A01**
Sandia National Labs., Livermore, CA.
OH Rotational Temperature from Two-Line Laser Excited Fluorescence.
R. J. Cattolica. Jun 80, 17p CONF-800712-4
Contract AC04-76DP00789
15. AIAA thermophysics conference and 13. AIAA fluid and plasma dynamics conference, Snowmass, CO, USA, 14 Jul 1980.

A two-line laser excited fluorescence technique has been developed to measure the rotational temperature of the OH molecule. This technique eliminates problems encountered in the application of other laser fluorescence methods for measuring the OH temperature in combustion environments such as: fluorescence trapping, nonequilibrium excited state population, spectral bandwith sensitivity, and quenching. The technique consists of exciting a specific rotational level in the A exp 2 sigma (v' = 0) excited state from two different rotational levels in the X exp 2 PI(v'' = 0) ground state of the OH molecule using a tunable dye laser and monitoring the broad band fluorescence. An example of the implementation of this technique in an atmospheric pressure methane-air flat flame is included. The possible application of this technique in turbulent combustion is also evaluated. (ERA citation 05:031019)

SAND-80-8223 PC **A03**/MF **A01**
Sandia Labs., Livermore, CA.
Fundamental Combustion and Diagnostics Research at Sandia. Progress Report from January-March 1980.
D. L. Hartley, and M. A. Gusinow. Jun 80, 43p
Contract AC04-76DP00789

The combustion research at Sandia Laboratories sponsored by the Office of Basic Energy Sciences (OBES) emphasizes basic research into fundamental problems associated with combustion. Special emphasis is placed on the development and application of advanced research methods. The overall program addresses: (1) detailed chemistry of combustion, (2) fundamental processes associated with laminar and turbulent flames, (3) development of research techniques specifically applicable to combustion environments, and (4) operation of the user-oriented Combustion Research Facility. This report presents status reports on the research sponsored by OBES. The first section contains activities in Combustion Research, the second section contains activities in Molecular Physics and Spectroscopy, and the third section contains activities in Diagnostics Research. (ERA citation 05:031020)

SAND-80-8640 PC **A02**/MF **A01**
Sandia Labs., Livermore, CA.
Crossed-Beam, Background-Free CARS Measurements in a Methane Diffusion Flame.
R. L. Farrow, P. L. Mattern, and L. A. Rahn. Jun 80, 17p CONF-800808-4
Contract AC04-76DP00789
International conference on raman spectroscopy, Ottawa, Canada, 4 Aug 1980.

A crossed-beam, background-free CARS configuration has been used to probe the flame front of a methane diffusion flame. Preliminary results are reported that demonstrate an enhanced signal-to-noise ratio and an increase in spatial resolution in comparison with conventional CARS experiments. (ERA citation 05:031021)

UCRL-84653 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Chemical Kinetics and Modeling of Combustion Processes.
C. K. Westbrook, and F. L. Dryer. 18 Jul 80, 49p CONF-800809-4
Contracts W-7405-ENG-48, AS02-77ET112
18. combustion symposium, Waterloo, Canada, 17 Aug 1980.

This paper reviews the mechanisms used for the combustion of hydrocarbon fuels and some of the practical problems to which they have been applied. Chemical kinetic reaction mechanisms are strongly hierarchical in that mechanisms for the combustion of more complex fuels contain within them submechanisms for simpler fuel molecules. With this basic structure in mind, mechanisms for H sub 2 -O sub 2 , CO, CH sub 4 , and CH sub 3 OH are discussed, followed by C sub 2 species including ethane, ethylene, and acetylene, and finally by a single C sub 3 species, propane. Validation of the elementary reactions and rates in a reaction mechanism is strongly influenced by the combustion environment being studied. For this reason, we emphasize comprehensive reaction mechanisms developed using data from a variety of experimental systems. We review some of the principles and techniques involved in the development and application of these kinetics models for hydrocarbon fuels. Applications of reaction mechanisms to combustion systems include purely kinetic problems and others requiring a treatment of transport effects. The former class includes shock tubes, plug flow reactors, and stirred reactors, while the latter includes laminar flame propagation, flame quenching, and flame inhibition. Each of these combustion systems is discussed, emphasizing the role of chemical kinetics. (ERA citation 05:031022)

21D. Fuels

AD-A088 008/8 PC **A03**/MF **A01**
Southwest Research Inst San Antonio TX Army Fuels and Lubricants Research Lab
Army Experience and Requirements for Stability and Cleanliness of Diesel Fuels.
Interim rept.,
L. L. Stavinoha, S. R. Westbrook, and M. E. LePera. Jul 80, 42p Rept no. AFLRL-128
Contract DAAK70-80-C-0001

The report reviews the general topic of fuel deterioration. Primary emphasis is on diesel fuels used in compression ignition engines, which power the majority of Army tactical and combat vehicles. Field problems regarding fuel stability and related problems are summarized, and the statuses of ongoing R&D programs are outlined. This information places in perspective the background which has prompted current research activities to detect, predict, and prevent fuel stability-associated equipment failures. Concern for anticipating deleterious product formation in current and future fuel formulations composed of diverse petroleum crude and synthetic (shale or coal) crude oils, fuel/equipment interactions, diverse storage conditions, and the increased desire for prolonged storage periods provide the driving factors in defining the Army's fuel stability research programs. While placing these concerns in perspective, the Army's present and future needs for diesel fuel stability and cleanliness control are identified. (Author)

AD-A088 045/8 PC **A05**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
Service Test of Two Fuel Conductivity Additives.
Final rept. 1 Apr 77-1 Jan 80,
Charles R. Martel, and Frank P. Morse. May 80, 86p Rept no. AFWAL-TR-80-2051

A service test of two fuel conductivity (anti-static) additives was conducted from April 1977 to May 1979 at eight Air Force bases. Since bases have continued to use the additive, a portion of the data reported herein extends to January 1980. The two candidate fuel additives were Shell Chemical Company's ASA-3 and E.I. duPont de Nemours and Company's Stadis 450. The additives were injected into the JP-4 aviation turbine fuel at either the refinery or terminal supporting the base. The conductivity of the JP-4 delivered to the service test base was to be maintained between 200 and 600 pS/m. The minimum and maximum fuel conductivity limits for servicing to aircraft was 100 to 700 pS/m. The effects of the additives on the air base fuel systems, filter separator elements, and on aircraft were monitored. (Author)

AD-A088 055/9 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Microbial Deterioration of Hydrocarbon Fuels from Oil Shale, Coal, and Petroleum. II. Growth and Inhibition of Bacteria and Fungi.
Memorandum rept.,
Marian E. May, and Rex A. Neihof. 1 Aug 80, 26p Rept no. NRL-MR-4294
See also report dated 20 Aug 79, AD-A073 761.

The recurring problems caused by microbial contamination of conventional fuels has led to an evaluation of the susceptibility of aircraft fuels from alternate sources (synthetic fuels). JP-5 fuel from coal and two different lots of oil shale (Shale I and II) were studied. Shale I differed from Shale II in having a much higher nitrogen content. Anaerobic, sulfate-reducing bacteria were able to grow as well with JP-5 from coal and oil shale as with petroleum. In fungal susceptibility tests with four different strains of Cladosporium resinae and one Candida sp., Shale II supported good fungal growth while Shale I did not; coal was highly inhibitory. The inhibition caused by Shale I was traced to the alkalinity produced by basic, nitrogen-containing

extractables in this fuel, but coal contains specific, still unidentified inhibitory constituents. It was also found that the normally high pH of seawater media was sufficient to inhibit C. resinae. Growth which occasionally occurred in seawater/fuel systems was apparently due to establishment of reduced pH in a local microenvironment. (Author)

ANL/SPG-9 PC **A03**/MF **A01**
Argonne National Lab., IL.
Grain Ethanol as a Petroleum Substitute: A Perspective.
T. G. Alston. Apr 80, 29p
Contract W-31-109-ENG-38

Present tax exemptions for gasohol are more than sufficient to move ethanol into the gasoline market in a number of states. The principal near-term response to this profit opportunity, production of ethanol from feed grains, matches a limited biomass resource to an enormous market. This report estimates upper-bound prices for feed grains resulting from gasohol tax exemptions and concludes that grain price increases could be substantial. As shown else-where by Alston and Asbury, industrial uses constitute a more economical market for grain ethanol, one in which the product is now competitive with ethanol derived from petroleum and natural gas liquids. Without tax exemptions for gasohol, grain ethanol would now be displacing petroleum in the industrial market at a net economic gain, rather than in the fuel market at a net economic loss. The present analysis indicates that this industrial market for ethanol could grow significantly, principally by use of grain ethanol as an intermediate in production of chemicals now derived from petroleum and natural gas. (ERA citation 05:030402)

BNL-27782 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Fusion Reactors for Hydrogen Production Via Electrolysis.
J. A. Fillo, J. R. Powell, and M. Steinberg. 1979, 7p CONF-791204-37
Contract AC02-76CH00016
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10 Dec 1979.

The decreasing availability of fossil fuels emphasizes the need to develop systems which will produce synthetic fuel to substitute for and supplement the natural supply. An important first step in the synthesis of liquid and gaseous fuels is the production of hydrogen. Thermonuclear fusion offers an inexhaustible source of energy for the production of hydrogen from water. Depending on design, electric generation efficiencies of approx. 40 to 60% and hydrogen production efficiencies by high temperature electrolysis of approx. 50 to 70% are projected for fusion reactors using high temperature blankets. (ERA citation 05:028552)

BNL-27891 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Fusion: An Energy Source for Synthetic Fuels.
J. A. Fillo, J Powell, and M. Steinberg. 1980, 9p CONF-800590-1
Contract AC02-76CH00016
AIAA international meeting and technical display global technology 2000, Baltimore, MD, USA, 6 May 1980.

The decreasing availability of fossil fuels emphasizes the need to develop systems which will produce synthetic fuel to substitute for and supplement the natural supply. An important first step in the synthesis of liquid and gaseous fuels is the production of hydrogen. Thermonuclear fusion offers an inexhaustible source of energy for the production of hydrogen from water. Depending on design, electric generation efficiencies of approx. 40 to 60% and hydrogen production efficiencies by high temperature electrolysis of approx. 50 to 70% are projected for fusion reactors using high temperature blankets. Fusion/coal symbiotic systems appear economically promising for the first generation of commercial fusion synfuels plants. Coal production requirements and the environmental effects of large-scale coal usage would be greatly reduced by a fusion/coal system. In the long term, there could be a gradual transition to an inexhaustible energy system based solely on fusion. (ERA citation 05:028553)

CONF-800629-3 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
DOE Small Scale Fuel Alcohol Plant Design.
D. M. LaRue, and J. G. Richardson. 1980, 13p
Contract AC07-76ID01570
Symposium on commercial uses of geothermal energy, Boise, ID, USA, 16 Jun 1980.

The Department of Energy, in an effort to facilitate the deployment of rural-based ethanol production capability, has undertaken this effort to develop a basic small-scale plant design capable of producing anhydrous ethanol. The design, when completed, will contain all necessary specifications and diagrams sufficient for the construction of a plant. The design concept is modular; that is, sections of the plant can stand alone or be integrated into other designs with comparable throughput rates. The plant design will be easily scaled up or down from the designed flow rate of 25 gallons of ethanol per hour. Conversion factors will be provided with the final design package to explain scale-up and scale-down procedures. The intent of this program is to provide potential small-scale producers with sound information about the size, engineering requirements, costs and level of effort in building such a system. (ERA citation 05:030404)

COO-4388-8 PC **A06**/MF **A01**
Dynatech Corp., Cambridge, MA.
Liquid Fuels Production from Biomass. Progress Report No. 8, April 1-June 30, 1979.
J. E. Sanderson, D. V. Garcia-Martinez, G. S. George, J. J. Dillon, and M. S. Molyneaux. 23 Jul 79, 118p
Contract AC02-77ET20050

The current program to convert biomass into liquid hydrocarbon fuels is an extension of the previous program to ferment marine algae to acetic acid. In that study, it was found that marine algae could be converted to higher aliphatic organic acids and that these acids could be readily removed from the fermentation both by membrane or liquid-liquid extraction. It was then proposed to convert these higher organic acids to aliphatic hydrocarbons via Kolbe Electrolysis, which may be used as a diesel fuel. The accompishments in this program for the first year of work are as follows: a coenzyme M anologue, 2-bromoethanesulfonic acid has been shown to be an effective suppressor of methane in nonsterile anaerobic fermentation of cellulosic substrates; a tapered auger device has been designed and built which has been demonstrated on the bench to be effective for adding substrate and removing residue in a continuous manner from a fixed packed bed fermenter; a solvent extracter system using kerosene as the nonaqueous phase has been constructed and is currently in operation in series with the 300 liter fixed packed bed fermenter; although additional work is required to optimize the electrolysis process the electrolytic oxidation of organic acids produced in the 300 liter fixed packed bed fermenter is operating with a favorable energy balance of 6/1 based on the applied potential; the liquid-liquid extractor system is operating in line with 300 liter fixed packed bed fermentor; the other components of an integrated continuous system, the continuous feed device and the Kolbe electrolysis cell are operating satisfactorily out of line on a scale compatible with the 300 liter fixed packed bed fermentor; and an economic analysis for a 1000 ton per day plant has been performed and has been improved and updated based on additional experimental results. (ERA citation 05:030405)

DOE/BC/10008-9 PC **A04**/MF **A01**
Stubbs Overbeck and Associates, Inc., Houston, TX.
Engineering Design of a Solvent Treatment/Distillation Used Lubricating Oil Re-Refinery.
D. W. Brinkman. Jun 80, 74p
Contract AC19-79BC10008

Drawings and specifications were prepared for a 10 million gallon per year used lubricating oil re-refinery based on the solvent treatment/distillation process developed and patented by the Bartlesville DOE Energy Technology Center. In addition, flowsheets were developed for facilities to treat 2, 5, and 20 million gallons per year. Using these drawings and specifications, a detailed capital cost estimate was prepared for the 10 million gallon facilities. Prorated estimates were derived for the other three capacities. (ERA citation 05:030195)

DOE/BC/10171-1 PC **A05**/MF **A01**
Texas A and M Univ., College Station. Dept. of Biochemistry and Biophysics.
Analysis of Heavy Ends from Petroleum by Probe Microdistillation/Mass Spectrometry. Quarterly Report, December 15, 1979-March 14, 1980.
R. D. Grigsby, and L. R. Schronk. 20 May 80, 97p
Contract AC19-80BC10171

Seven samples from a 535 to 675 exp 0 C distillate of a Wilmington, CA crude oil were received from the Instrumental Section of the Bartleville Energy Technology Center. These samples were obtained from extensive fractionation of the original crude through the technique developed for the American Petroleum Institute Research Project 60 (API 60). The samples were subjected to probe microdistillation with the temperature programmed to maintain a constant ion current. Between 5 and 22 spectra were recorded for each. Three spectra per sample were processed into graphic and tabulated form to display the molecular weight distribution as a function of distillation temperature. A number of elemental compositions were obtained by high-resolution mass spectroscopy for sample GPC 209-76, fraction 22. This permitted partial assignment of Z numbers to components. (ERA citation 05:030198)

DOE/CS/56051-1 PC **A04**/MF **A01**
Mueller Associates, Inc., Baltimore, MD.
Biomass as a Feedstock for Highway Vehicle Fuels: A Resource and Availability Survey.
Dec 79, 54p
Contract EX-76-C-01-2098

The study was initiated because of the recognized need to compile a concise description of biomass as an energy base for liquid transportation fuels (namely alcohols) for highway vehicles. The aim is to provide a brief familiarization of biomass-related terminology to those with limited technical background and to present a summary assessment of the potential that biomass can provide as a resource base for liquid transportation fuels. Biomass may play a significant role in supplying liquid fuels for transportation (indeed, for other sectors, as well), however, there are fundamental limitations imposed by the size of the biomass, resource, production and distribution economics, and the difficulty of ensuring sustained availability for an extended period of time. Bioconversion is one of a number of developing energy options that individually, may make relatively small contributions but in the aggregate, are likely to be significant. Thus, research and development related to fuels from biomass and their utilization continue to be major areas of activity sponsored by the Department of Energy. (ERA citation 05:030406)

DOE/CS/56051-2 PC **A02**/MF **A01**
Mueller Associates, Inc., Baltimore, MD.
Potential Sources of Non-Petroleum Based Alcohols for Vehicular Fleet Testing.
Oct 79, 23p
Contract EX-76-C-01-2098

The quantity of alcohol required to supply all of the US Department of Energy's vehicular fleet test fuel needs during the period fiscal year 1980 through 1982 could reach on the order of 1.5 and 1.6 million gallons per year of 200 proof ethanol and fuel-grade methanol, respectively. During the time frame of fiscal year 1982 through 1987, vehicular fleet testing fuel needs could approach 8 and 10 million gallons per year of ethanol and methanol, respectively. In terms of supply, all of the ethanol fleet test fuel requirements can be satisfied by domestic fermentation ethanol from non-petroleum/non-natural gas resources. Initially, the major ethanol fermentation firms are potentially capable of supplying the necessary quantity of ethanol. As the test project progresses and fleet size expands, the outlook for ethanol supply from the major firms as well as from other private sources, both existing and planned, is very promising. This supply outlook could be altered significantly if an expanding Gasohol market demands a major portion of the available ethanol production. It is in the Federal Government's best interest to arrange for ethanol supply agreements as soon as possible so that fleet test volume requirements can be assured. The supply situation for methanol from non-petroleum/non-

natural gas resources is not very promising. It appears that methanol produced from coal or biomass will not be available before 1985 at the earliest, assuming that a decision to construct a sizeable plant is made immediately. As such, fuel grade methanol for use in the reliability fleet test project will most likely have to be obtained from the existing petroleum/natural gas-based methanol market. This market is currently operating at a level below maximum capacity and several older mothballed plants can be reactivated if the economic situation warrants. (ERA citation 05:030842)

DOE/EA-0107 PC **A08**/MF **A01**
Department of Energy, Washington, DC. Office of Regulations and Emergency Planning.
Environmental Assessment: Notice of Proposed Rulemaking for the Allocation and Pricing of Gasohol.
Jun 80, 151p

This report presents the results of an environmental assessment (EA) of a pending proposal by the Economic Regulatory Administration concerning the allocation and pricing of gasohol and the unleaded gasoline which is used as its blend stock, and an alternative proposal to exempt gasohol and unleaded blend stock from allocation and price regulations. The objective of this EA is to identify and assess the seriousness of environmental impacts resulting from the proposed rule in order to determine whether an environmental impact statement is needed. A regulatory analysis has also been prepared on the proposed rule. A summary of the findings of this EA is provided. It is concluded that no significant environmental impacts are attributable to the proposed rule and, therefore, that an environmental impact statement is not required. 29 references, 5 figures, 15 tables. (ERA citation 05:029194)

DOE/RG-0035/2 PC **A99**/MF **A01**
Department of Energy, Washington, DC. Economic Regulatory Administration.
Public Utility Regulatory Policies Act of 1978: Natural Gas Rate Design Study.
May 80, 616p

First, the comments on May 3, 1979 Notice of Inquiry of DOE relating to the Gas Utility Rate Design Study Required by Section 306 of PURPA are presented. Then, comments on the following are included: (1) ICF Gas Utility Model, Gas Utility Model Data Outputs, Scenario Design; (2) Interim Model Development Report with Example Case Illustrations; (3) Interim Report on Simulation of Seven Rate Forms; (4) Methodology for Assessing the Impacts of Alternative Rate Designs on Industrial Energy Use; (5) Simulation of Marginal-Cost-Based Natural Gas Rates; and (6) Preliminary Discussion Draft of the Gas Rate Design Study. Among the most frequent comments expressed were the following: (a) the public should be given the opportunity to review the final report prior to its submission to Congress; (b) results based on a single computer model of only four hypothetical utility situations cannot be used for policy-making purposes for individual companies or the entire gas industry; (c) there has been an unobjective treatment of traditional and economic cost rate structures; the practical difficulties and potential detrimental consequences of economic cost rates are not fully disclosed; and (d) it is erroneous to assume that end users, particularly residential customers, are influenced by price signals in the rate structure, as opposed to the total bill. (ERA citation 05:030772)

DOE/SF/10760-2 PC **A02**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Hydroprocessing of Heavy Oils. Quarterly Technical Progress Report, December 4, 1979-March 3, 1980.
R. M. Bowman, B. J. Jody, and G. Jarvi. Jun 80, 23p
Contract AC03-79SF10760

During the second quarter of the Contract, Task 1 experimentation to hydrodesulfurize (HDS) and hydrocrack (HC) No. 4 fuel oil continued. Two of the three available catalysts (Shell 324 and a proprietary Union Carbide catalyst) were evaluated. Shell 324 could remove as much as 96% of the sulfur originally in the oil and convert up to 41% of the nonreformable fraction in the oil to reformable products at 500 exp 0 C. Operating at this high temperature, however, resulted in the deposit of black carbon-containing material on the catalyst pellets, thereby restricting the flow across the reactor. The Union Carbide catalyst was tested at temperatures up to 470 exp 0 C. The product oil was found to represent 95% sulfur removal and 48% conversion to reformable products. Black carbon-based deposits were detected on the catalyst. Because the conditions under which these tests were carried out were not optimized, it may be possible to improve the quality of the products. Also, recycling the nonreformable material back into the reactor for further cracking will be investigated. (ERA citation 05:030180)

FE-1747-T1 PC **A08**/MF **A01**
Equity Oil Co., Salt Lake City, UT.
BX In Situ Oil Shale Project. Site Evaluation Report.
11 Nov 77, 155p
Contract ET-78-F-03-1747

The Site Evaluation of the BX In Situ Oil Shale Project was conducted to determine if the selected project site was suitable for the conduct of the proposed project. Site evaluation work included the drilling, coring, and logging of two core holes and the analysis of the cores therefrom; temperature logging of existing wells at the project site; and the performance and analysis of pulse tests to evaluate inter-well communication. The site evaluation confirmed that the site would be suitable for the proposed project. (ERA citation 05:030210)

FE-2346-72 PC **A02**/MF **A01**
Dow Chemical Co., Midland, MI.
Energy from in Situ Processing of Antrim Oil Shale. Quarterly Technical Progress Report, April-June 1980.
D. C. Young. Jul 80, 24p DOW/SRPR-72
Contract AC01-76ET121153

Processing of data from the F80 extraction trials continued for much of this quarter. Several computer programs were written so the data could be evaluated or accessed for plotting. Numerous computer generated plots were made for use in the topical reports which are in preparation. Activity at the experimental site has been directed toward an orderly shutdown and dismantling of equipment. All but nine of the wells were filled with cement and capped in accordance with th requirements of the Michigan Department of Natural Resources. Shale characterization work was continued at four universities in Michigan under subcontracts. Work on final reports of several of these projects has begun. (ERA citation 05:030211)

FE-2785-T1 PC **A05**/MF **A01**
IIT Research Inst., Chicago, IL.
Design, Engineering, and Evaluation of Refractory Liner for Slagging Gasifier. Second Quarterly Technical Progress Report.
R. F. Firestone, M. J. Greaves, and C. Hales. Apr 79, 88p
Contract ET-78-C-01-2785

The design of a refractory lining system for a slagging coal gasifier should take into account: oxidation or reduction of the refractory materials subject to the process atmosphere at the operating temperature; and the corrosive action of the slag at the operating temperature. The initial cost of the refractory lining system for a slagging coal gasifier may represent from ten to twenty-five percent of the cost of the reactor. The total cost of the refractory lining system for a slagging coal gasifier, including the total cost of all subsequent relines, may represent more than fifty percent of the total cost of the reactor. The final choice of a lining system should be based on an economic analysis which reflects the total cost of the lining system over the life of the coal gasifier. The findings of this study are preliminary in nature and are subject to change, following completion of Phases B through F of this program. (ERA citation 04:050984)

Juel-1640 PC **A05**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung.
Hydrogen in Metals: Significant Properties and Examples for Their Application.
H. Wenzl. Jan 80, 90p
In German.
U.S. Sales Only.

The structure, thermodynamics, and kinetics of some important alloys of hydrogen in metals are discussed in view of their use as construction materials in the hydrogen technology. Most important are the binary systems Li/H sub 2 , Li/T sub 2 , Mg/H sub 2 , and the quasibinary system FeTi/H sub 2 . Examples are given for the following applications: hydrogen production from water by electrolysis, purification and storage of hydrogen as chemical and nuclear fuel, heat storage, thermochemical energy conversion. (ERA citation 05:030353)

LBL-11019 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Catalytic Biomass Liquefaction. Quarterly Report, January-March 1980.
S. Ergun, R. Djafar, C. Figueroa, C. Karatas, and L. Schaleger. May 80, 12p
Contract W-7405-ENG-48

Progress during the quarter in the chemical characterization of the products of wood liquefaction is reported. The liquefaction of hydrolyzed slurries in a tubular reactor bomb system is described. The solvolytic depolymerization of wood is compared to the hydrolysis process. Results of a few illustrative runs are pesented. The characterization and flow properties of concentrated slurries are discussed. Progress on the construction of biomass continuous liquefaction unit is described. (ERA citation 05:030415)

LBL-9702 PC **A06**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
On-Line Zeeman Atomic Absorption Spectroscopy for Mercury Analysis in Oil Shale Gases. Final Report.
D. C. Girvin, and J. P. Fox. 1 Aug 79, 119p
Contract W-7405-ENG-48

The technique utilizes ZAA for on-line measurement of mercury in the presence of smoke, organic vapors, and oil mist in offgases from oil shale processing plants. The spectrometer utilizes a new flow-through stainless steel (SS) furnace maintained at 900 exp 0 C by joule heating. Corrosion of the furnace by H sub 2 S in the sample gas is minimized by diffusion of Al into the surface of the SS. Corrosion tests with 2% (v/v) H sub 2 S at 1093 exp 0 C gave an estimated furnace lifetime of three days. The instrumental response with this furnace is characterized by a detection limit (DL) of 2 ppB, a linear response up to 100 ppB, and a precision of +- 7% or better. In the 50 ppB to 1.6 ppM range a furnace with a 5 cm optical absorption tube yields a DL of 10 ppB, a linear response up to 800 ppB, and a precision of +- 10% or better. Sample gas flow rates can be varied between 400 and 4000 scc/min for either furance. (ERA citation 05:030218)

N80-29300/4 PC **A11**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Aircraft Research and Technology for Future Fuels.
Jul 80, 229p NASA-CP-2146, E-398
Symp. Held in Cleveland, Ohio, 16-17APR. 1980.

No abstract available.

N80-29502/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Some Advantages of Methane in an Aircraft Gas Turbine.
R. W. Graham, and A. J. Glassman. 1980, 18p
NASA-TM-81559, E-520
Proposed for Presentation at Aerospace Congr., Los Angeles, 13-16 Oct. 1980; Sponsored by Asae.

Liquid methane, which can be manufactured from any of the hydrocarbon sources such as coal, shale biomass, and organic waste considered as a petroleum replacement for aircraft fuels. A simple cycle analysis is carried out for a turboprop engine flying a Mach 0.8 and 10, 688 meters (35,000 ft.) altitude. Cycle performance comparisions are rendered for four cases in which the turbine cooling air is cooled or not cooled by the methane fuel. The

advantages and disadvantages of involving the fuel in the turbine cooling system are discussed. Methane combustion characteristics are appreciably different from Jet A and will require different combustor designs. Although a number of similar difficult technical problems exist, a highly fuel efficient turboprop engine burning methane appear to be feasible.

ORNL-5564 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Production of Methanol and Methanol-Related Fuels from Coal.
R. Salmon, M. S. Edwards, and R. M. Wham.
May 80, 102p
Contract W-7405-ENG-26

This report presents a review of available information on processes for the production of methanol and methanol-related fuels from natural gas and coal. Existing commercial technology for the production of methanol from synthesis gas by the high-, low-, and intermediate-pressure processes is described. The technological and economic factors involved in the optimization of a methanol production plant are discussed. Production of synthesis gas and methanol from coal is reviewed, both from the standpoint of existing technology using Lurgi gasifiers and proposed processes using other gasifiers. An overview of the technology and economics of the Mobil MTG process for converting methanol to gasoline is presented. A search was made for obsolete or discarded processes that might be useful for the production of low-purity methanol for fuels purposes. It was concluded that none of these older processes offers any advantage over current commercial technology for fuel-grade methanol production. (ERA citation 05:030358)

PB80-218811 PC **A04**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Development of New Gas Odorants.
Final rept.
Dec 78, 67p ADL-C-81780, GRI-78/0019
Contract GRI-5010-352-0047

The research program discussed in the report was performed under a program to develop new odorants for natural gas which would be more resistant to adsorption by soils and to pipeline fading. It was understood that any new odorant developed should exhibit warning characteristics similar to or better than those currently used. While last year's work was concerned primarily with adsorption, this year's effort was directed toward the oxidation and pipeline fading of odorants. The approach to this study included the development of a test which simulated pipeline fading and allowed the measurement of the relative stability of existing and candidate odorants.

PB80-222797 PC **A03**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Overview of Research and Development Activities in Biomass.
Final rept.
Aug 78, 44p GRI-78/0003
Contract GRI-5010-380-0055

The purpose of this report is to provide the Gas Research Institute (GRI) with an overview of research activities related to the production of synthetic natural gas (SNG) from biomass sources. While covering a variety of research activities related to biomass production and conversion, the report focuses upon the production of methane from biomass. The overview is intended to assist GRI in planning its research program, and to provide an information base for ensuring that its programs are coordinated with activities of industry and government.

PB80-224694 PC **A04**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Preliminary Cost Benefit Analysis of GRI's LNG (Liquefied Natural Gas) Research Program.
Final rept.
Mar 78, 55p 15187-002-001, GRI-78/0029
Contract GRI-5010-381-0054

This report examines the relationship between the economic benefits and costs of LNG, and the effects of the research programs of the Gas Research Institute (GRI).

PB80-224702 PC **A04**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Overview of National Research and Development Activities in Synthetic Natural Gas from Coal.
Final rept.
Sep 79, 63p GRI-79/0003
Contract GRI-5010-380-0055

The purpose of this report is to provide an overview of activities which are related to the Gas Research Institute's (GRI) Synthetic Natural Gas (SNG) from Coal Subprogram Area. The information presented is intended to assist GRI in guiding its own research activities and to provide an information base for ensuring that its programs are coordinated with the activities of industry and government.

PB80-226558 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Evaluation of NRG No. 1, A Fuel Additive.
Technical rept.
Feb 78, 11p EPA-AA-TAEB-77-19

NRG No. 1 is a fuel additive developed and marketed by NRG International Inc. of Clayville, New York. A representative of NRG supplied EPA with results of tests conducted by Scott Environmental Technology, Inc. which showed that use of the additives resulted in increased fuel economy as well as significant reductions in HC and CO emissions. On the basis of this data, EPA decided to conduct confirmatory tests.

PB80-227986 PC **A10**/MF **A01**
Science Applications, Inc., McLean, VA. Energy Utilization Group.
Overview of Unconventional Natural Gas Research and Development Activities.
Sep 80, 224p GRI-80/0006

This overview report is organized into four major sections. Section 1, the Executive Summary, provides the essential findings of the overall report. Section 2, Trends in Uncoventional Natural Gas Production, provides a relative perspective of the resources, production history, and future role in the U.S. gas supply of the unconventional gas sources. Section 3, Unconventional Gas Sources, includes five subsections relating to each of the four major unconventional gas sources: 3.1 Western Tight Gas Sands, 3.2 Eastern Devonian Gas Shales, 3.3 Methan from Coalbeds, 3.4 Geopressured brines, and 3.5 Other Unconventional Natural Gas Sources. Each subsection provides a brief description of the resources involved, a review of the major RD&D activities, identification of major constratints to commercializaton, and a list of technical problems needed to be addressed by additional research work.

PB80-228018 PC **A07**/MF **A01**
Ohio State Univ., Columbus. Engineering Experiment Station.
Surface Combustion of Hydrogen and Other Light Gaseous Fuels in the Presence of an Electrostatic Field and Corona Discharge.
Final rept.,
F.A. Kulacki, S. Boriah, and S. A. Martin. 31 Dec 79, 150p EES-561X-F
Contract GRI-5009-362-008, Grant NSF-ENG76-05032

Major achievements of the study are (1) the demonstration that fluid mechanic effects produced by corona discharge in an annular flow reactor can significantly alter mass transfer to a catalytically active outer cylinder and (2) the measurement of the augmentation of mass transfer coefficients and overall first order rate constants under corona discharge as a function of discharge current, flow rate and inlet mole fraction of fuel. Experiments were done for hydrogen, ethane and propane in air at a constant temperature on platinized alumina.

PB80-815830 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Hydrogen Storage as a Hydride. 1975-July, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1975-Jul 80,
Gerald F. Zollars. Sep 80, 69p
Supersedes NTIS/PS-79/0772/8. Sponsored in part by National Technical Information Service, Springfield, VA.

These citations from the international literature concern the storage of hydrogen in various metal hydrides. Binary and intermetallic hydrides are considered. Specific alloys discussed are iron-titanium, lanthanum-nickel, magnesium-copper, and magnesium-nickel among others. (This updated bibliography contains 133 citations, 36 of which are new entries to the previous edition.)

PB80-850936 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Methane from Waste. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Howard L. Ogushwitz. Jul 80, 84p
NERACIAANT0312
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles include a discussion of the production of methane and other fuels from organic waste, sewage, manure, and other solid wastes. (Contains 085 citations.)

PB80-851058 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Liquefied Petroleum Gas. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
William V. Sassi. Aug 80, 110p NERACEI NT0428
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the storage, transport, production, uses, safety, and market demand of liquefied petroleum (LP) gases. Also included are a few articles on the standard method of testing for various LP gases. (Contains 118 citations.)

PB80-853302 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Liquefied Petroleum Gas. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Aug 80, 64p
NERACEDBNT0428
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss storage, transportation, production, uses, safety, and market demand of liquefied petroleum gas. Also included are articles on the standard method of test for various liquefied petroleum (LP) gases. (Contains 059 citations.)

PB80-857584 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Biomass Conversion from Agricultural Sources. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
John H. Frey. Jun 80, 95p NERACEDBNT0703
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the economics, feasibility, and methods for biomass conversion from agricltural wastes, e.g., crop residues and animal wastes, into gaseous and liquid fuel energy sources are contained in this retrospective bibliography. (Contains 186 citations.)

PB80-857949 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Methane from Waste. April, 1977-May, 1980 (Citations from the Energy Data Base).
Rept. for Apr 77-May 80,
Howard L. Ogushwitz. Jun 80, 205p
NERACEDBNT0312

Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography discuss the methods of production of methane and other fuels from organic waste, sewage, manure, and other solid wastes. (Contains 170 citations.)

PB80-858176 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Coal Oil Mixtures. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
William V. Sassi. Jun 80, 33p
NERACEDBNT0341
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles cited in this bibliography discuss the methods, and techniques for the production of coal oil mixtures for fuel extension. Also discussed are future prospects for such fuel mixtures. (Contains 016 citations.)

PB80-858368 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Combustion Additives. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Lawrence H. Marcus. Jun 80, 135p
NERACIAANT0462
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports which deal with additives to fuels and lubricants to improve combustion efficiency, reduce particulate and other pollutant emissions and preserve combustion equipment, including turbines, diesel and internal combustion engines, boilers and generators. Fluidized bed combustion, including coal combustion, is also discussed. (Contains 157 citations.)

PB80-858376 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Combustion Additives. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 171p
NERACUSGNT0462
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports which deal with additives to fuels and lubricants to improve combustion efficiency, reduce particulate and other pollutant emissions and preserve combustion equipment, including turbines, diesel and internal combustion engines, boilers and generators. Fluidized bed combustion, including coal combustion, is also discussed. (Contains 197 citations.)

PB80-858384 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Combustion Additives. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Lawrence H. Marcus. Jun 80, 206p
NERACEDBNT0462
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports which deal with additives to fuels and lubricants to improve combustion efficiency, reduce particulate and other pollutant emissions and preserve combustion equipment, including turbines, diesel and internal combustion engines, boilers and generators. Fluidized bed combustion, including coal combustion, is also discussed. (Contains 200 citations.)

PB80-858392 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Combustion Additives. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Lawrence H. Marcus. Jun 80, 171p NERACEI NT0462
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports which deal with additives to fuels and lubricants to improve combustion efficiency, reduce particulate and other pollutant emissions and preserve combustion equipment, including turbines, diesel and internal combustion engines, boilers and generators. Fluidized bed combustion, including coal combustion, is also discussed. (Contains 188 citations.)

PB80-859648 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Biomass Conversion. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 137p NERACUSGNT0703
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the economics, feasibility, and methods for biomass conversation from organic wastes into gaseous and liquid fuel energy sources are contained in this retrospective bibliography. (Contains 085 citations.)

PB80-859655 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Biomass Conversion. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
John H. Frey. Jun 80, 55p NERACEI NT0703
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on the economics, feasibility, and methods for biomass conversation from organic wastes into gaseous and liquid fuel energy sources are contained in this retrospective bibliography. (Contains 048 citations.)

SAND-80-0824 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Oil Shale Programs. Sixteenth Quarterly Report, October-December 1979.
A. L. Stevens. Jun 80, 35p
Contract AC04-76DP00789

This document is the sixteenth in a continuing series of quarterly reports, and describes the Sandia National Laboratories oil shale activities during the period between October 1, 1979 and December 31, 1979. Sandia's major responsibility to the DOE in situ oil shale program is to provide a quantitative evaluation to DOE of the various field projects being supported by DOE in the development of commercial in situ oil shale processes. This requires the deployment of instrumentation systems and analysis techniques to evaluate key procedures and operations. In order to fulfill this responsibility, it is necessary to develop new and advanced instrumentation systems and associated deployment, recording and analysis techniques that are unique to the field projects. In addition, a rock mechanics program provides material properties, material response models, and computational methods to support the design and evaluation functions. This report describes detailed activities in these project areas over the last quarter. (ERA citation 05:030212)

SAND-80-1455 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Minimum Bed Parameters for In Situ Processing of Oil Shale. Second Quarterly Report, January 1-March 31, 1980.
C. E. Tyner. Jun 80, 20p
Contract AC04-76DP00789

This is the second in a series of quarterly reports on the Minimum Bed Parameters for In Situ Processing of Oil Shale Program (FE Control No. 4-79 ET 14165.000). It describes activities during the period January 1 to March 31, 1980, including modification of the laboratory retorting system to eliminate problems with the ignition and product collecttion systems and the successful retorting of a 16% void sample. The sample consisted of a 7.6 cm diameter by 23 cm competent core of oil shale with three 0.64 cm slices of material removed parallel to the axis of the cylinder. The 1.4 cm thick slabs constituted 70% of the sample volume, while oil shale rubble (-.32 + .16 cm) was used to occupy nearly half the remaining volume (14%), leaving 16% void. The sample was instrumented, sealed in an insulated retort vessel, ignited with hot (700 exp 0 C) air, and combustion-retorted with air. The observed retorting rate was 10 cm/hr, the local heating rate near the block surface in the retorting zone was 18 exp 0 C/min, and peak temperatures were about 825 exp 0 C. Temperature profiles across the retort cross-section indicated some limited heat loss. Oil yield was 92% of Fischer Assay. Results of block retort model calculations (without rubble in the fracture) are in good agreement with those observed, namely a retorting rate of 12 cm/hr, a local heating rate of 7 exp 0 C/min, peak temperatures around 900 exp 0 C, and a yield of 90% FA. (ERA citation 05:030214)

SAND-80-1470 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Oil Shale Programs. Seventeenth Quarter Report, January-March 1980.
A. L. Stevens. Jul 80, 70p
Contract AC04-76DP00789

This document is the seventeenth in a continuing series of quarterly reports, and describes the Sandia National Laboratories oil shale activities during the period between January 1, 1980 and March 31, 1980. Sandia's major role in the DOE Fossil Energy in situ oil shale program is to provide a quantitative evaluation to DOE of the field projects being supported by DOE/FE in the development of commercial in situ oil shale processes. This requires the deployment of instrumentation systems and the application of analysis techniques to evaluate key procedures and operations. In order to fulfill this responsibility, it is necessary to develop new and advanced instrumentation systems and associated deployment, recording, and analysis techniques that are unique to the field project needs. In addition, a rock mechanics program provides material properties, material response models, and computational methods for use in the design, analysis, and evaluation functions. This report describes detailed activities in these project areas over the last quarter. (ERA citation 05:030215)

UCRL-Trans-11599 PC **A02**/MF **A01**
Cryopumping of Hydrogen and Helium.
J. C. Boissin, J. J. Thibault, and A. Richardt.
1972, 15p
Contract W-7405-ENG-48
A, Vide, Suppl. n157 P103-110 1972.

Adsorption on an argon cryodeposit enables the application of liquid-helium cryopumps to be extended to the pumping of helium and hydrogen. The magnitudes of the pumped flows (10 exp -2 t.l/s), pumped quantities (50 t.l of He, 400 t.l of H sub 2) and measured pumping speeds (several thousand l/s) show that, in most applications, 4.2 K cryopumps require no additional pumping facility for hydrogen and helium. (ERA citation 05:030356)

21E. Jet and Gas Turbine Engines

AD-A087 977/5 PC **A08**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-Sur-Seine (France)
The Application of Design to Cost and Life Cycle to Aircraft Engines.
Lecture series.
May 80, 170p Rept no. AGARD-LS-107
Text in English and French.

All of the NATO nations are faced with major concern for the growing cost of defence and the need to ensure that cost and performance are optimized. The requirements and related costs of weapon systems have come under close examination. The entire life cycle of a weapon system and its subsystems must be examined. The cost of design and development must now include not only the cost of production but also deployment, training, operational use, and support. The use of new technology and new management techniques

are essential to obtaining the most for the available money. The purpose of this Lecture Series is to examine the latest methodologies of cost/performance comparison and trade-offs for aircraft engines. Information will include data collection, analysis, modelling and estimating all development and operations costs. Also addressed will be contractual provisions and the costs related to incentives for performance and reliability. The latest applications in both government and industry will be covered, with examples and experiences from the military and civilian sectors. (Author)

AD-A088 006/2 PC **A11**/MF **A01**
Purdue Univ Lafayette IN Project Squid Headquarters
Project SQUID.
Final technical rept. Oct 67-Dec 79,
R. F. Hoglund, R. Goulard, and S. N. B. Murthy. Feb 80, 239p Rept no. SQUID-PU-R2-80
Contracts N00014-75-C-1143, N00014-67-A-0226

The Final Technical Report provides a summary report of the activities under Project SQUID carried out under Contracts N00014-67-0226, N00014-67-A-0226 and N00014-75-C-1143 during the Period Oct. 1967-Dec. 1979 with the Office of Naval Research projects carried out under sub-contract to Purdue University as well as Workshops and Colloquia organized under the auspices of Project SQUID are discussed. Project SQUID is a continuing program devoted to fundamental research of long range relevance to the technology of jet propulsion. (Author)

AD-A088 019/5 PC **A07**/MF **A01**
General Electric Co Cincinnati OH Aircraft Engine Group
Low Cost Process for Manufacture of Oxide Dispersion Strengthened (ODS) Turbine Nozzle Components.
Final rept. 30 Jun 76-31 Dec 79,
J. A. Stahl, R. J. Perkins, and P. G. Bailey. Dec 79, 143p AFML-TR-79-4163
Contract F33615-76-C-5235

This final technical report describes a program for producing low cost processes for the manufacture of Oxide Dispersion Strengthened (ODS) turbine nozzle components. The processes established in this program will demonstrate that high pressure turbine vanes, low pressure turbine vanes and high pressure turbine bands can be manufactured from near-net shape components via directional forging and forge bending. (Author)

AD-A088 231/6 PC **A03**/MF **A01**
McDonnell Douglas Research Labs St Louis MO
Unsteady Transonic Flows in a Two-Dimensional Diffuser.
Annual rept. 1 Apr 79-31 Mar 80,
Miklos Sajben, Thomas J. Bogar, and Joseph C. Kroutil. May 80, 29p AFOSR-TR-80-0628
Contract F49620-77-C-0082

Extensive measurements of shock position and pressure distributions (wall static, core flow static, and core flow total) were made, complemented by spark schlieren and high-speed schlieren photographic information. Measurements were made at shock Mach numbers up to 1.35, with and without excitation. The excitation amplitudes were low, with frequencies from 0 to 330 Hz. Unexcited flows displayed two dominant natural frequencies for attached flows (shock Mach numbers below 1.27) and one dominant peak for separated flows (shock Mach numbers above 1.28). The dominant frequencies depend strongly on shock strength. Diffuser response to excitation appears to follow patterns expected on the basis of low-amplitude (acoustic) wave propagation concepts, provided that the stream-wise variation of the flow speed is considered and realistic boundary conditions are applied at the ends of the channel. The study strongly suggests that the effective acoustic impedance associated with the shock/boundary-layer interaction zone is an important determinant of diffuser response to small-amplitude external perturbations.

AD-A088 501/2 Not available NTIS
Washington Univ St Louis MO Dept of Mechanical Engineering
In-Plane Vibration and Buckling of a Rotating Beam Clamped Off the Axis of Rotation,
D. A. Peters, and D. H. Hodges. Aug 79, 5p
Availability: Pub. in Jnl. of Applied Mechanics, v102 n2 p398-402 Jun 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A088 511/1 PC **A12**/MF **A01**
Kaman AviDyne Burlington MA
Further Evaluation of Blast Tests of an Engine Inlet.
Final rept. 1 Apr 78-31 Mar 79,
J. Ray Ruetenik, Robert F. Smiley, and Michael A. Tomayko. 31 Mar 79, 262p KA-TR-165, DNA-4994F, AD-E300 882
Contract DNA001-78-C-0239

A test program was conducted to simulate blast wave intercepts with a scaled aircraft engine in subsonic flight. Initial results were reported in DNA 4590F. This report presents additional test data and evaluated results. Jumps in total pressure at the engine face produced by blast interaction with the blastward and leeward inlets are evaluated with respect to effects of four test variables: inlet weight flow, Mach number, shock overpressure and intercept angle. The total pressure rose more rapidly in the blast inlet than the leeward inlet, following the blast intercept, and by a larger amount. In many tests the rise in the leeward inlet was followed by a rapid fall-off, indicating possible flow separation in the inlet walls. The two-dimensional Blast Induced Distortion (BID) code provides good representation of effects essentially two-dimensional and inviscid, such as ramp, cowl and engine-face pressures of the blastward inlet. Blast wave reflection from the engine is expected to be a potential cause of distortion through boundary-layer retardation. The effect on engine-face total pressure is examined with respect to the four test variable. Improved calculations of the effect of the engine-reflected blast wave on the boundary layers in the inlets, made using the generalized NASA-Lewis BLAYER code, indicate that the boundary-layer separation would result. (Author)

DOE/ET/13547-T1 PC **A06**/MF **A01**
Pittsburgh Univ., PA. Dept. of Metallurgical and Materials Engineering.
Hot Corrosivity of Coal Gasification Products on Gas Turbine Alloys. Summary Report, 15 April 1978-15 November 1979.
G. H. Meier, and E. A. Gulbransen. 1979, 115p
Contract AC01-79ET13547

The results of this investigation have produced mechanisms for the hot corrosion of a number of pure metals and alloys in the types of atmospheres likely to be obtained in turbines using coal conversion products as fuel. The results of these mechanistic studies suggest the following conclusions regarding application of alloys in these situations: (1) Simple Cr sub 2 O sub 3 -forming alloys of both Co and Ni have good hot corrosion resistance to most of the deposits likely to form in turbines burning coal conversion products with the exception of deposits containing considerable amounts of chlorides. (2) The presence of carbide phases is detrimental to the hot corrosion resistance of both Ni and Co alloys. (3) The complex alloy compositions characteristic of superalloys result in susceptibility to hot corrosion, the extent of which is sensitive to salt composition, particularly for Ni-base alloys. (4) Conclusion 3 suggests that uncoated alloys will not be able to provide the require combination of corrosion resistance and high-temperature strength for any of the components in turbines running on coal gas. (5) Several alloys including Co-18Cr-6Al-1Hf, Co-27Cr, Co-20Ni-27Cr, Ni-50Cr, and Fe-18Cr-6Al-Hf have corrosion resistance for use as coatings and claddings at high temperatures (900 to 1000 exp 0 C). (6) The problem of low temperature hot corrosion (700 to 800 exp 0 C) must still be investigated for the types of deposits likely to form in coal fired systems before selection of reliable coatings can be made. (ERA citation 05:030123)

N80-29299/8 PC **A21**/MF **A01**
General Electric Co., Cincinnati, OH.
Acoustic Performance of a 50.8-cm (20-Inch) Diameter Variable-Pitch Fan and Inlet. Volume 2: Acoustic Data.
Final Report.
K. R. Bilwakesh, A. Clemons, and D. L. Stimpert. Nov 79, 495p NASA-CR-135118, R77AEG229-V-2

Results from acoustic tests on a 50.8 cm (20 inch) QCSEE Under-the-Wing (UTW) engine, variable pitch fan and inlet simulator are tabulated. Tests were run in both forward and reverse thrust modes with a bellmouth inlet, five accelerating inlets (one hardwall and four treated), and four low Mach number inlets (one hardwall and three treated). The 1/3 octave-band acoustic data are presented for the model size on the measured 5.2 m (17.0 ft) arc and also data scaled to full QCSEE size 71:20 on a 152.4 m (500 ft) sideline.

N80-29331/9 PC **A05**/MF **A01**
TRW, Inc., Cleveland, OH.
Tungsten Wire/Fecraly Matrix Turbine Blade Fabrication Study.
P. Melnyk, and J. N. Fleck. Dec 79, 99p NASA-CR-159788, TRW-ER-8101
Contract NAS3-20391

The objective was to establish a viable FRS monotape technology base to fabricate a complex, advanced turbine blade. All elements of monotape fabrication were addressed. A new process for incorporation of the matrix, including bi-alloy matrices, was developed. Bonding, cleaning, cutting, sizing, and forming parameters were established. These monotapes were then used to fabricate a 48 ply solid JT9D-7F 1st stage turbine blade. Core technology was then developed and first a 12 ply and then a 7 ply shell hollow airfoil was fabricated. As the fabrication technology advanced, additional airfoils incorporated further elements of sophistication, by introducing in sequence bonded root blocks, cross-plying, bi-metallic matrix, tip cap, trailing edge slots, and impingement inserts.

N80-29332/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Investigation of Performance Deterioration of the CF6/Jt9d, High-Bypass Ratios Turbofan Engines.
J. A. Ziemianski, and C. M. Mehalic. 1980, 22p NASA-TM-81552, E-511
Proposed for Presentation at the 56TH AGARD Propulsion and Energetics Symp. On Turbine Engine Testing, Turin, 29SEP. - 3 Oct. 1980 and Sae Aerospace Congr., Los Angeles, 13-16 Oct. 1980.

The aircraft energy efficiency program within NASA is developing technology required to improve the fuel efficiency of commercial subsonic transport aricraft. One segment of this program includes engine diagnostics which is directed toward determining the sources and causes of performance deterioration in the Pratt and Whitney Aircraft JT9D and General Electric CF6 high-bypass ratio turbofan engines and developing technology for minimizing the performance losses. Results of engine performance deterioration investigations based on historical data, special engine tests, and specific tests to define the influence of flight loads and component clearances on performance are presented. The results of analysis of several damage mechanisms that contribute to performance deterioration such as blade tip rubs, airfoil surface roughness and erosion, and thermal distortion are also included. The significance of these damage mechanisms on component and overall engine performance is discussed.

N80-29333/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Description of the Warm Core Turbine Facility Recently Installed at NASA Lewis Research Center.
W. J. Whitney, R. G. Stabe, and T. P. Moffitt. 1980, 18p NASA-TM-81562, E-524
Proposed for Presentation at Aerospace Congr., Los Angeles, 13-16 Oct. 1980; Sponsored by AM. Soc. Of Automotive Engrs.

The two net facilities were installed and operated at their design, or rated conditions. The important feature of both of these facilities is that the ratio of turbine inlet temperature to coolant temperature encountered in high temperature engines can be duplicated at moderate turbine inlet temperature.

The limits of the facilities with regard to maximum temperature, maximum pressure, maximum mass flow rate, turbine size, and dynamometer torque-speed characteristics are discussed.

N80-29369/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Single-Stage Electrohydraulic Servosystem for Actuating an Airflow Valve with Frequencies to 500 Hertz.
J. A. Webb, Jr., O. Mehmed, and C. F. Lorenzo. Aug 80, 35p NASA-TP-1678, E-252

An airflow valve and its electrohydraulic actuation servosystem are described. The servosystem uses a high-power, single-stage servovalve to obtain a dynamic response beyond that of systems designed with conventional two-stage servovalves. The electrohydraulic servosystem is analyzed and the limitations imposed on system performance by such nonlinearities as signal saturations and power limitations are discussed. Descriptions of the mechanical design concepts and developmental considerations are included. Dynamic data, in the form of sweep-frequency test results, are presented and comparison with analytical results obtained with an analog computer model is made.

N80-30155/9 PC **A08**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Analytical Investigation of Fan Tone Noise Due to Ingested Atmospheric Turbulence.
Final Report.
U. W. Ganz. Aug 80, 151p NASA-CR-3302
Contract NAS1-15085

The atmospheric turbulence involved in the fan noise generation is evaluated with an existing model for the atmospheric turbulence and an extended version of an existing model concerned with the effects of a flow contraction on convected turbulence. Fan tone noise due to ingested atmospheric turbulence is evaluated with existing fan noise models. The results indicate that the difference in fan narrowband noise due to atmospheric turbulence between static and flight landing approach conditions is in the order of 30 dB. It is concluded that fan noise due to atmospheric turbulence is insignificant in flight conditions for the fans used in the current high bypass ratio engines. The difference in fan narrowband noise between the two conditions is primarily due to the low intensity of the turbulence involved in fan noise generation in flight conditions. Fan noise due to atmospheric turbulence in static conditions should be reduced below the flight fan broadband noise levels which is best achieved with a reduction in the intensity of the fan inflow turbulence. Such a reduction can be obtained with the use of an inflow control device, low wind velocities, small surface roughness in the test stand environment, and large engine axis height above the ground. Peak sound power levels for fan tone noise due to ingested turbulence occur for transverse integral scales in the order of 25% of the rotor blade spacing in the fan tip region.

PB80-852609 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Helicopter Engines. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
T. David Kennedy. Jun 80, 54p
NERACIAANT0878
Sponsored in part by National Technical Information Service, Springfield, VA.

Technical articles collected in this bibliography deal with the broad subject of gas turbine engines as used in helicopters. General objectives and needs are stressed as are reports on the development of specific engines. In-depth design or analysis of gas turbines is not covered except as requirements for engine characteristics and performance are concerned. (Contains 049 citations.)

PB80-852817 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Helicopter Engines. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
T. David Kennedy. Jun 80, 144p
NERACUSGNT0878
Sponsored in part by National Technical Information Service, Springfield, VA.

Articles collected in this bibliography cover a very broad range of topics dealing with helicopter engines. Technical reports include those relating to specific components or engine development as well as evaluation reports of specific helicopters or test programs which involve engines. Some reports cover various flight tests of helicopters with engine performance data as one part of a broader test program. (Contains 100 citations.)

21F. Nuclear Propulsion

N80-29379/8 PC **A03**/MF **A01**
Technische Universitaet, Munich (Germany, F.R.). Lehrstuhl fuer Raumfahrttechnik.
Interstellar Flight: When. Interstellarer Flug: Wann.
H. O. Ruppe. Jun 79, 29p TUM-RT-KB-79/3
Text in German.

The possibility of interstellar flight is discussed in connection with project Daedalus. Fabrication of fuel pellets for the drive system is proposed, using Helium 3 obtained from the atmosphere of Jupiter.

21G. Reciprocating Engines

PB80-851454 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fuel Injection for Internal Combustion Engines. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jun 80, 148p NERACIAANT0601
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the research and development of fuel injection systems applied to internal combustion engines and turbines. The use of gasoline, diesel and synthetic fuels and liquid gas systems are also discussed. (Contains 154 citations.)

PB80-851462 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fuel Injection for Internal Combustion Engines. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 125p
NERACUSGNT0601
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the research and development of fuel injection systems applied to internal combustion engines and turbines. The use of gasoline, diesel and synthetic fuels and liquid gas systems are also discussed. (Contains 140 citations.)

PB80-851470 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fuel Injection for Internal Combustion Engines. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jun 80, 192p NERACEI NT0601
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the research and development of fuel injection systems applied to internal combustion engines and turbines. The use of gasoline, diesel and synthetic fuels and liquid gas systems are also discussed. (Contains 140 citations.)

PB80-851488 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fuel Injection for Internal Combustion Engines. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Walter Van Put. Jun 80, 186p
NERACEDBNT0601
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations cover information on the research and development of fuel injection systems applied to internal combustion engines and turbines. The use of gasoline, diesel and synthetic fuels and liquid gas systems are also discussed. (Contains 162 citations.)

PB80-851694 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Stirling Engines. June, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-May 80,
Howard L. Ogushwitz. Jun 80, 76p
NERACIAANT0535
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design, test, development, and application of various types of Stirling engines to automobiles, the utilization of solar energy, an artificial heart system, etc. (Contains 091 citations.)

PB80-851702 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Stirling Engines. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 158p
NERACUSGNT0535
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design, test, development, and application of various types of Stirling engines to automobiles, the utilization of solar energy, an artificial heart system, etc. (Contains 131 citations.)

PB80-851710 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Stirling Engines. August, 1977-May, 1980 (Citations from the Energy Data Base).
Rept. for Aug 77-May 80,
Howard L. Ogushwitz. Jun 80, 193p
NERACEDBNT0535
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design, test, development, and application of various types of Stirling engines to automobiles, the utilization of solar energy, an artificial heart system, etc. (Contains 188 citations.)

PB80-851728 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Stirling Engines. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 110p NERACEI NT0535
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the design, test, development, and application of various types of Stirling engines to automobiles, the utilization of solar energy, an artificial heart system, etc. (Contains 101 citations.)

PB80-851751 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.

Wankel Engines. June, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jun 76-May 80,
Howard L. Ogushwitz. Jun 80, 83p
NERACEDBNT0533
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the various types of Wankel engines. A description of the design and application of these engines to automobiles, aviation, etc. is also included. (Contains 065 citations.)

PB80-852262 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Wankel Engines. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Howard L. Ogushwitz. Jun 80, 54p NERACEI NT0533
Sponsored in part by National Technical Information Service, Springfield, VA.

Research studies and articles cited in this bibliography contain a discussion of the various types of Wankel engines. A description of the design and application of these engines to automobiles, aviation, etc. is also included. (Contains 041 citations.)

PB80-852668 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Engine Turbochargers and Superchargers. July, 1976-May, 1980 (Citations from the Energy Data Base).
Rept. for Jul 76-May 80,
T. David Kennedy. Jun 80, 28p
NERACEDBNT0884
Sponsored in part by National Technical Information Service, Springfield, VA.

Citations in this bibliography include technical articles on turbochargers and superchargers used on diesel engines and other internal combustion engines. Extensively covered are automotive applications both foreign and domestic and including gasoline, alcohol and diesel fuels. Topics include efficiency, future trends, design features, fuel feed, operation descriptions, combustion and specific engines. (Contains 136 citations.)

PB80-855240 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Turbochargers. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 71p NERACEI NT0726
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning the design, development, efficiency, and performance of turbomachinery. Citations include descriptions of diesel engines, gas engines, centrifugal compressors, two-stage turbos, and optimization techniques as they apply to turbochargers. (Contains 081 citations.)

PB80-855257 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Two-stroke Engines. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 79p NERACEI NT0727
Sponsored in part by National Technical Information Service, Springfield, VA.

Research reports from global sources are cited concerning new designs, analytical and experimental investigations, and performance characteristics of two-stroke engines. Citations include descriptions of torque characteristics, fuel injection, independent lubrication systems, reed valve induction, and noise levels. (Contains 030 citations.)

21H. Rocket Motors and Engines

AD-A088 265/4 PC **A03**/MF **A01**
Naval Weapons Center China Lake CA
A Proposed Standard Climate for Evaluating Rocket Exhaust Secondary Smoke Formation and Visibility. Revision 1.
Technical memo.,
Andrew C. victor. Jan 79, 30p NWC-TM-3638-REV-1, GIDEP-E164-2183
Revision 1 to report dated Nov 78.

Under certain climatic conditions rocket motor exhaust plumes can form contrails which are highly visible at long ranges. It is difficult to predict accurately the formation and visibility of these contrails unless the important climatic factors (temperature and moisture content) are known. This report proposes a preliminary definition of a climate at 40 deg N and 50 deg N latitude for altitudes from 2-15 km based on a review of relevant literature. Both temperature and moisture content are expressed in terms of mean values and standard deviations so that that probability of occurrence of any climatic conditions can be estimated. (Author)

N80-29744/3 PC **A03**/MF **A01**
Technische Universitaet, Munich (Germany, F.R.). Lehrstuhl fuer Raumfahrttechnik.
The Efficiency of Electrothermically Heated Hydrazine Generators Leistungsvorhersage Elektrothermisch Aufgeheizter Hydrazintriebwerke.
D. Hayn, M. Braitinger, and R. H. Schmucker.
Aug 78, 35p TUM-RT-KB-78/5
Text in German.

Improvement of the performance of hydrazine engines by increasing the enthalpy of the decomposition products using an electrical heater was studied. The increase in efficiency is limited by the maximum temperature permitted in the combustion chamber and by the energy transformation in the expansion jet. Theoretical and experimental results are compared.

21I. Rocket Propellants

AD-A088 080/7 PC **A04**/MF **A01**
Pennsylvania State Univ University Park Dept of Mechanical Engineering
Transient Ignition Mechanisms of Confined Solid Propellants under Rapid Pressurization.
Summary rept. 1 Aug 79-31 Jul 80,
Kenneth K. Kuo, Mridul Kumar, and Anil K. Kulkarni. 6 Aug 80, 58p
Contract N00014-79-C-0762

A comprehensive theoretical model was formulated to study the transient ignition mechanisms of solid propellants under rapidly varying pressure conditions. The model considers a two-dimensional geometry to describe the ignition of a heterogeneous propellant. The rate of pressurization has been included in the energy equation to simulate rocket motor ignition conditions. The model does not make any a priori assumption of solid-phase, heterogeneous, or gas-phase ignition mechanism. Chemical reactions are considered in the gas phase, at the interface as well as in the subsurface. The most up-to-date chemical kinetics information is included in the model. A generalized ignition criterion has been proposed which allows ignition to occur at any site.

PATENT-4 210 474 Not available NTIS
National Aeronautics and Space Administration. Pasadena Office, CA.
Silicone Containing Solid Propellant.
Patent,
K. N. R. Ramohalli. Filed 16 Oct 78, patented 1 Jul 80, 4p N80-28536/4, PAT-APPL-951 830
Supersedes PAT-APPL-951 830-78, N79-10224 (17 - 01, p 0030).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

The addition of a small amount, for example 1% by weight, of a liquid silicone oil to a metal containing solid rocket propellant provides a significant reduction in heat transfer to the inert nozzle walls. Metal oxide slag collection and blockage of the nozzle are eliminated and the burning rate is increased by about 5% to 10% thus improving ballistic performance.

PB80-855323 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Monopropellants. January, 1974-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 74-May 80,
Walter Van Put. Jul 80, 148p NERACIAANT0714
Sponsored in part by National Technical Information Service, Springfield, VA.

Citations from worldwide reports cover research and applications of monopropellants used in high thrust engines such as rockets. Studies on burning properties, catalytic decomposition of monopropellants are also included. (Contains 135 citations.)

PB80-855331 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Monopropellants. June, 1970-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 171p
NERACUSGNT0714
Sponsored in part by National Technical Information Service, Springfield, VA.

Citations from worldwide reports cover research and applications of monopropellants used in high thrust engines such as rockets. Studies on burning properties, catalytic decomposition of monopropellants are also included. (Contains 164 citations.)

PB80-855349 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Monopropellants. June, 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jun 80,
Walter Van Put. Jul 80, 23p NERACEI NT0714
Sponsored in part by National Technical Information Service, Springfield, VA.

Citations from worldwide reports cover research and applications of monopropellants used in high thrust engines such as rockets. Studies on burning properties, catalytic decomposition of monopropellants are also included. (Contains 030 citations.)

22. SPACE TECHNOLOGY

22A. Astronautics

N80-29376/4 PC **A03**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Systems Definition Study for Shuttle Demonstration Flights of Large Space Structures. Volume 1: Executive Summary.
Final Report.
Jul 79, 29p NASA-CR-161534, DRD-MA-04-V-1
Contract NAS8-32390
3.

The development of large space structure technology is discussed, with emphasis on space fabricated structures which are automatically manufactured in space from sheet-strip materials and assembled on-orbit. Definition of a flight demonstra-

tion involving an Automated Beam Builder and the building and assembling of large structures is presented.

N80-29377/2 PC **A10**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Systems Definition Study for Shuttle Demonstration Flights of Large Space Structures, Volume 2: Technical Report.
Final Report.
Jul 79, 220p NASA-CR-161535, DRD-MA-04-V-2
Contract NAS8-32390
3.

The development of large space structure (LSS) technology is discussed, with emphasis on space fabricated structures which are automatically manufactured in space from sheet-strip materials and assembled on-orbit. It is concluded that an LSS flight demonstration using an Automated Beam Builder and the orbiter as a construction base, could be performed in the 1983-1984 time period. The estimated cost is $24 million exclusive of shuttle launch costs. During the mission, a simple space platform could be constructed in-orbit to accommodate user requirements associated with earth viewing and materials exposure experiments needs.

N80-29378/0 PC **A05**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Systems Definition Study for Shuttle Demonstration Flights of Large Space Structures. Volume 3: Thermal Analyses.
Final Report.
Jul 79, 80p NASA-CR-161536, DRD-MA-04-V-3
Contract NAS8-32390
3.

the development of large space structure technology is discussed. A detailed thermal analysis of a model space fabricated 1 meter beam is presented. Alternative thermal coatings are evaluated, and deflections, stresses, and stiffness variations resulting from flight orientations and solar conditions are predicted.

N80-29380/6 PC **A03**/MF **A01**
Technische Universitaet, Munich (Germany, F.R.). Lehrstuhl fuer Raumfahrttechnik.
Spaceflight as an Influence on Humanity Raumfahrt fuer die Menschheit.
H. O. Ruppe. Jun 79, 26p TUM-RT-KB-79/4
Text in German.

The application of spaceflight to the solution of some problems of society is discussed. The time scale extends to the end of the present century. Emphasis is placed on the use of satellites of the LANDSAT type for resource exploration, and military security. Commercial applications of space technology are mentioned.

N80-29381/4 PC **A03**/MF **A01**
Technische Universitaet, Munich (Germany, F.R.). Lehrstuhl fuer Raumfahrttechnik.
Spaceflight in the Year 2000 Raumfahrt im Jahre 2000.
H. O. Ruppe. Jun 79, 45p TUM-RT-KB-79/5
Text in German.

The economic and technical aspects of space flight in the near future are discussed. Industrial activity in space in areas such as pharmaceuticals and semiconductors is mentioned, as is the possibility of disposing of nuclear waste in space.

N80-29382/2 PC **A03**/MF **A01**
Hamburg Univ. (Germany, F.R.). Lehrstuhl fuer Ingenieurwissenschaften.
Preparation of Alloys with Specific Physical Properties under Zero Gravity Conditions.
Final Report.
H. Ahlborn, and H. Richter. Nov 79, 48p BMFT-FB-W-79-15
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Based on a study of the literature, possibilities offered by Spacelab for preparation of new or the improvement of conventional materials with specific physical properties were studied. For hard magnetic materials, the lack of thermal convection in space would allow for the preparation of longer and more perfect elongated single domain particles (ESD crystals), the improvement of transcrystallization processes in the fabrication of AlNiCo magnets, and for an undisturbed unidirectional eutectic solidification favoring the production of Mn-Bi as well as superconducting alloys. Crucible free melting of AlNiCo alloys and of Sm-Co alloys could improve their magnetic properties, too. The mixture stability expected in space experiments will allow for the preparation of composite materials with homogeneous distributed second phases for use as electric contact materials and for superconducting materials based on the proximity effect. The expected homogeneous distribution components formed in montectic alloys in the liquid state would also make possible, in the case of Al-Pb alloys, the testing of their properties as bearing materials.

N80-29403/6 PC **A02**
Akademya Nauk SSSR, Moscow. Inst. of Space Research.
A Geosynchronous Probe for Extraecliptic Studies of the Solar Wind and for Astrophysical Investigations.
V. M. Balebanov, A. E. Balikhin, O. L. Vaisberg, V. B. Zhuravlev, and A. N. Matveev. 1979, 17p D-279

The concept of a probe being launched into a heliocentric orbit is examined. To accommodate solar wind experiments the orbital plane must be inclined to the ecliptic plane. The orbital parameters of the probe are chosen basically the same as those of the Earth, while the launching procedure provides a synchronous orbital motion of the probe with the Earth. It is shown that this orbit provides a unique opportunity to fix the direction of the probe Earth baseline in inertial space. The probe is to be spin stabilized; a possible hardware configuration is discussed. The spin axis of the probe and the lines of sight of the astrophysical equipment are to be colinear with the probe Earth baseline, thus allowing for the combination astrophysical and out-of-ecliptic experiments. It is also shown that the proposed spin stabilization of the probe can be achieved using only optical solar sensors and very simple logic. The axis of the radio communication antenna, being parallel to the spin axis, provides continuous communication with the Earth.

N80-29410/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Sts-1 Environmental Control and Life Support System. Consumables and Thermal Analysis.
G. Steines. Aug 80, 32p NASA-TM-81035, JSC-16720

The Environmental Control and Life Support Systems (ECLSS)/thermal systems analysis for the Space Transportation System 1 Flight (STS-1) was performed using the shuttle environmental consumables usage requirements evaluation (SECURE) computer program. This program employs a nodal technique utilizing the Fortran Environmental Analysis Routines (FEAR). The output parameters evaluated were consumable quantities, fluid temperatures, heat transfer and rejection, and cabin atmospheric pressure. Analysis of these indicated that adequate margins exist for the nonpropulsive consumables and related thermal environment.

N80-29412/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Scheduling Algorithm for Mission Planning and Logistics Evaluation (Sample). Volume 1: User's Guide.
E. Dupnick, and D. Wiggins. Feb 80, 41p NASA-TM-8114, JSC-16395-V-1
3.

An interactive computer program for automatically generating traffic models for the Space Transportation System (STS) is presented. Information concerning run stream construction, input data, and output data is provided. The flow of the interactive data stream is described. Error messages are specified, along with suggestions for remedial action. In addition, formats and parameter definitions for the payload data set (payload model), feasible combination file, and traffic model are documented.

N80-29413/5 PC **A09**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Scheduling Algorithm for Mission Planning and Logistics Evaluation (Sample). Volume 2: Mission Payloads Subsystem Description.
E. Dupnick, and D. Wiggins. Feb 80, 182p NASA-TM-81115, JSC-16395-V-2

The scheduling algorithm for mission planning and logistics evaluation (SAMPLE) is presented. Two major subsystems are included: The mission payloads program; and the set covering program. Formats and parameter definitions for the payload data set (payload model), feasible combination file, and traffic model are documented.

N80-29418/4 PC **A09**/MF **A01**
Old Dominion Univ., Norfolk, VA. Dept. of Mathematical Sciences.
Preliminary Investigations into the Active Control of Large Space Structures: Solution of the Timoshenko Beam Equations by the Method of Characteristics.
Final Report, 15 Feb. 1976 - 15 Aug. 1980.
J. Tweed. Aug 80, 197p NASA-CR-163408
Grant NSG-1279

An algorithm was developed and incorporated into a computer program for solving the damped, Timoshenko beam equations with free-free boundary conditions and prescribed initial data. A number of special cases are considered and, where appropriate, comparisons are made with known results.

N80-30060/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Scheduling Algorithm for Mission Planning and Logistics Evaluation (Sample). Volume 3: The Greedy Algorithm.
E. Dupnick, and D. Wiggins. Feb 80, 37p NASA-TM-8116, JCS-16395-V-3

The functional specifications, functional design and flow, and the program logic of the GREEDY computer program are described. The GREEDY program is a submodule of the Scheduling Algorithm for Mission Planning and Logistics Evaluation (SAMPLE) program and has been designed as a continuation of the shuttle Mission Payloads (MPLS) program. The MPLS uses input payload data to form a set of feasible payload combinations; from these, GREEDY selects a subset of combinations (a traffic model) so all payloads can be included without redundancy. The program also provides the user a tutorial option so that he can choose an alternate traffic model in case a particular traffic model is unacceptable.

N80-30262/3 PC **A11**/MF **A01**
Max-Planck-Institut fuer Kernphysik, Heidelberg (Germany, F.R.).
The Helios Micrometeoroid Experiment: Solar Probe Helios a and B Experiment 10.
Final Report.
E. Gruen, H. Fechtig, P. Gammelin, J. Kissel, and S. Auer. Oct 79, 243p BMFT-FB-W-79-09
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The micrometeoroid experiment on board Helios makes possible the in-situ detection of interplanetary dust particles. The experiment consists of two sensors which are inclined differently with respect to the equatorial plane of the spacecraft. It is based on the plasma production resulting from the impact of fast particles (V or=1 Km/sec) on a solid target. The instrument characteristics are discussed. Micrometeoroids are measured in the mass range from (10 to the -16) g to (10 to the -8)g and in the speed range from 2 km/sec to 50 km/sec. Additionally, the direction of impact is determined with an accuracy of + or - 60 deg. The particle charge is measured in the range from (10 to the - 14) to (10 to the -12) Coulomb. The ion composition of the impact plasma is mass analyzed with a time of flight spectrometer in the range 15 to 70 amu. The mass resolution is M/Delta M approximately 10.

22B. Spacecraft

AD-A088 460/1 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
A Simple Analysis of Spacecraft Charging Invoiving Blocked Photoelectron Currents,
Arthur L. Besse, and Allen G. Rubin. 15 Aug 79, 6p Rept no. AFGL-TR-80-0229
Pub. in Jnl. of Geophysical Research, v85 nA5 p2324-2328, 1 May 80.

No abstract available.

N80-29383/0 PC **A07**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Entry Guidance and Entry Autopilot (Sts-1 Baseline).
J. C. Harpold, and O. Hill. Aug 80, 126p NASA-TM-81034, JSC-16515
Supersedes Jsc-11746.

Preliminary entry guidance and autopilot software formulations, for use in the Mission Control Center (MCC) entry processor, are presented. The MCC requirements are met by a definition of coordinate systems, a list of parameter definitions for the software formulations, a description of the entry guidance detailed formulation requirements, a description of the detailed autopilot formualtion requirements, a description of the targeting routine, and a set of formulation flow charts.

N80-29406/9 PC **A02**/MF **A01**
Technische Universitaet, Munich (Germany, F.R.). Lehrstuhl fuer Raumfahrttechnik.
An Elevator in Space MIT Dem Fahrstuhl Ins All.
H. O. Ruppe. Jun 79, 25p TUM-RT-KB-79/6
Text in German.

A geostationary shaft satellite is proposed which is vertically stabilized in the Earth's gravitational field. The shaft is prolonged above and below the satellite so that it stays in stable equilibrium; the prolongation is continued until the inferior branch reaches the Earth's surface. The base is fixed and masses are attached to the superior branch so that the 'ladder' is stretched with the help of centrifugal force. In principle an elevator could then be installed in this tower.

N80-29407/7 PC **A06**/MF **A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.). Hauptabteilung Raumfahrtprogramme.
Conceptual Study of a European Remote Sensing Satellite with Combined Optical and Microwave Payload.
Final Report.
W. Gilg, E. Achtermann, K. L. Bitzer, K. Ernsberger, and K. H. Fabiunke. Nov 79, 110p BMFT-FB-W-79-18
Text in German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie Prepared in Cooperation with Dfvlr, Oberpfaffenhofen, West Germany.

The concept of a European remote sensing satellite (ERDSAT) launched by ARIANE and carrying a model payload, consisting of a synthetic aperture radar and an optical multispectral scanner with nine channels for land applications or coastal zone missions is characterized. The mission goal of ERDSAT is based on European user requirements where a strong need for optical and microwave sensor operation on board the same satellite in a simultaneous or sequential mode is expressed. A data collection system is included. The proposed satellite is three-axes-stabilized and has a Sun-synchronous, near polar circular orbit at 750 km altitude. The selected configuration separates payload module and bus module. A thermostable carbon fiber grating structure constitutes the central framework of the satellite. Each major subsystem is housed in a separate compartment and can be integrated and tested individually. First mass estimates result in 450 kg for the payload and 880 kg for the bus. The maximum power needed is 1750 W (for 6 minutes, three times a day), which is provided by a 1330 W solar array and two batteries.

N80-29411/9 PC **A99**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Orbiter Electrical Equipment Utilization Baseline.
Aug 80, 790p JSC-12561, REPT-77-FM-2-REV-5

The baseline for utilization of Orbiter electrical equipment in both electrical and Environmental Control and Life Support System (ECLSS) thermal analyses is established. It is a composite catalog of Space Shuttle equipment, as defined in the Shuttle Operational Data Book. The major functions and expected usage of each component type are described. Functional descriptions are designed to provide a fundamental understanding of the Orbiter electrical equipment, to insure correlation of equipment usage within nominal analyses, and to aid analysts in the formulation of off-nominal, contingency analyses.

N80-29414/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Et LOX Modal Survey Analysis and Test Assessment.
R. L. Mccomas. May 80, 32p NASA-TM-78287

The results are presented of the analysis and modal test of the liquid oxygen tank and intertank of the space shuttle external tank. The analytical models, test article, and support hardware are described. Frequency and damping are compared on a mode-by-mode basis. The data assessment clearly confirms the validity of the analytical model and establishes a high level of confidence that the methodology will accurately predict modal characteristics of flight configurations.

N80-29415/0 PC **A05**/MF **A01**
Rocket Research Corp., Redmond, WA.
Increased Capability Gas Generator for Space Shuttle Apu. Development/Hot Restart Test Report.
7 Jul 80, 95p NASA-CR-160764, REPT-80-R-695
Contract NAS9-16002

The design, fabrication, and testing of an increased capability gas generator for use in space shuttles are described. Results show an unlimited hot restart capability in the range of feed pressures from 400 psi to 80 psi. Effects of vacuum on hot restart were not addressed, and only beginning-of-life bed conditions were tested. No starts with bubbles were performed. A minimum expected life of 35 hours or more is projected, and the design will maintain a surface temperature of 350 F or more.

N80-29417/6 PC **A08**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Analysis of Space Shuttle Orbiter Entry Dynamics from Mach 10 to Mach 2.5 with the November 1976 Flight Control System.
R. W. Powell, and H. W. Stone. Aug 80, 163p NASA-TP-1667, L-13344

A six-degree-of-freedom simulation analysis was performed for the space shuttle orbiter entry from Mach 10 to Mach 2.5 with realistic off-nominal conditions using the flight control system referred to as the November 1976 Integrated Digital Autopilot. The off-nominal conditions included: (1) aerodynamic uncertainties in extrapolating from wind tunnel of flight characteristics, (2) error in deriving angle of attack from onboard instrumentation, (3) failure of two of the four reaction control-system thrusters on each side (design specification), and (4) lateral center-of-gravity offset. Many combinations of these off-nominal conditions resulted in a loss of the orbiter. Control-system modifications were identified to prevent this possibility.

N80-29419/2 PC **A08**/MF **A01**
California Univ., San Diego, La Jolla. Center for Astrophysics and Space Sciences.
Analysis of Differential and Active Charging Phenomena on Ats-5 and Ats-6.
Final Report, May 1977 - Dec. 1979.
R. C. Olsen, and E. C. Whipple, Jr.. 30 Jul 80, 154p NASA-CR-163433, UCSD-CASS-80-1
Grant NSG-3150

Spacecraft charging on the differential charging and artificial particle emission experiments on ATS 5 and ATS 6 were studied. Differential charging of spacecraft surfaces generated large electrostatic barriers to spacecraft generated electrons, from photoemission, secondary emission, and thermal emitters. The electron emitter could partially or totally discharge the satellite, but the mainframe recharged negatively in a few 10's of seconds. The time dependence of the charging behavior was explained by the relatively large capacitance for differential charging in comparison to the small spacecraft to space capacitance. A daylight charging event on ATS 6 was shown to have a charging behavior suggesting the dominance of differential charging on the absolute potential of the mainframe. Ion engine operations and plasma emission experiments on ATS 6 were shown to be an effective means of controlling the spacecraft potential in eclipse and sunlight. Elimination of barrier effects around the detectors and improving the quality of the particle data are discussed.

N80-29763/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Notch Sensitivity of Space Shuttle Tile Materials.
J. C. Newman, Jr.. Jul 80, 17p NASA-TM-81854

Tests were conducted at room temperature to determine the notch sensitivity of the thermal protection tile for the space shuttle. Two types of RSI tile were studied: LI-900 and LI-2200. Three point bend specimens were cut from discarded tiles in the in-plane (ip) and through-the-thickness (ttt) directions. They were tested with or without a sharp notch. The LI-900 (ip and ttt) specimens were not very notch sensitive, but the LI-2200 (ip and ttt) specimens were. The LI-2200 material showed about a 35 percent reduction in strength due to the presence of the notch. This reduction in strength should be considered in the design of mechanically fastened tile concepts.

N80-29764/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Photoelastic Tests on Models of Thermal Protection System for Space Shuttle Orbiter.
R. Prabhakaran, and P. A. Cooper. Aug 80, 18p NASA-TM-81866

The thermal protection system (TPS) of the space shuttle orbiter vehicle, consisting of ceramic tile/adhesive/strain isolator pad/adhesive/aluminum substructure, was modeled photoelasticity. A highly sensitive photoelastic material was used in the models to show the nature of the stress-transfer between the strain isolation pad (SIP) and the ceramic tile through the RTV-adhesive layer. Isochromatic fringe patterns were obtained for models subjected to tension and combined tension and bending. Tests indicated that the load-transfer between the SIP and the photoelastic material occurred at discrete locations causing stress concentrations in the photoelastic material. Stress concentration factors of the order of 1.9 were measured, but as the observed photoelastic response was an integrated effect through the model thickness, the local stress concentration factors at the SIP/tile interface could be even higher.

N80-29765/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Substructure Procedure for Including Tile Flexibility in Stress Analysis of Shuttle Thermal Protection System.
G. L. Giles. Aug 80, 12p NASA-TM-81864

A substructure procedure to include the flexibility of the tile in the stress analysis of the shuttle thermal protection system (TPS) is described. In this procedure, the TPS is divided into substructures of (1) the tile which is modeled by linear finite elements and (2) the SIP which is modeled as a nonlinear continuum. This procedure was applied for loading cases of uniform pressure, uniform moment, and an aerodynamic shock on various tile thicknesses. The ratios of through-the-thickness stresses in the SIP which were calculated using a flexible tile compared to using a rigid tile were found to be less than 1.05 for the cases considered.

N80-29766/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Some Space Shuttle Tile/Strain-Isolator-Pad Sinusodial Vibration Tests.
R. Miserentino, L. D. Pinson, and S. A. Leadbetter. Jul 80, 27p NASA-TM-81853

Vibration tests were performed on the tile/strain-isolator-pad system used as thermal protection for the space shuttle orbiter. Experimental data on normal and in-plane vibration response and damping properties are presented. Three test specimens exhibited shear type motion during failures that occurred in the tile near the tile/strain-isolator-pad bond-line. A dynamic instability is described which has large in-plane motion at a frequency one-half that of the nominal driving frequency. Analysis shows that this phenomenon is a parametric response.

N80-29768/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Effects of Substrate Deformation and Sip Thickness on Tile/Sip Interface Stresses for Shuttle Thermal Protection.
C. P. Shore, and R. Garcia. Jul 80, 21p NASA-TM-81855

A nonlinear analysis was used to study the effects of substrate deformation characteristics and strain isolator pad (SIP) thickness on TILE/SIP interface stresses for the space shuttle thermal protection system. The configuration analyzed consisted of a 5.08 cm thick, 15.24 cm square tile with a 12.7 cm square SIP footprint bordered by a 1.27 cm wide filler bar and was subjected to forces and moments representative of a 20.7 kPa aerodynamic shock passing over the tile. The SIP stress deflection curves were obtained after a 69 kPa proof load and 100 cycles conditioning at 55 kPa. The TILE/SIP interface stresses increase over flat substrate values for zero to peak substrate deformation amplitudes up to 0.191 cm by up to a factor of nearly five depending on deformation amplitude, half wave length, and location. Stresses for a 0.23 cm thick SIP found to be up to 60 percent greater than for a 0.41 cm thick SIP for identical loads and substrate deformation characteristics. A simplified method was developed for approximating the substrate location which produces maximum TILE/SIP interface stresses.

22D. Spacecraft Launch Vehicles and Ground Support

PB80-928009 PC **E02**/MF **A01**
Central Intelligence Agency, Washington, DC.
Ariane: A European Space Launch Vehicle.
Research paper.
Oct 80, 17p SW-80-10074
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928000.

Ariane is scheduled to become operational in mid-to-late 1981 and should be capable of launching most European satellites, including those intended for a geostationary orbit for the next decade. Flight tests of the Ariane thus far have resulted in one success and one failure.

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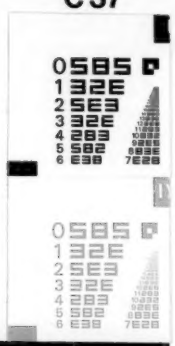

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